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ABSTRACT

The National Science Foundation, in attempting to monitor the health of U.S. science and technology, assembles and analyzes comprehensive measures of the financial and human resources that various sectors (government, industry, academia, and other nonprofit institutions) devote to scientific and technological activities. This annual report presents a concise but comprehensive summary of this type of science and technical information. Following a summary highlighting discussions and data in the report, data on national perspectives of R&D resources and science/engineering personnel are discussed and summarized in various charts and graphs. Data presented in the section on national perspectives of R&D resources focus on the R&D effort and the national economy; R&D by national objective; the R&D/GNP ratio; basic research, applied research, and development; and international comparisons. Data presented in the section on science/engineering (S/E) personnel focus on employment trends, S/F labor market balance, sectoral patterns and trends, women and minorities, doctoral scientists and engineers, and labor market dynamics. Detailed statistical tables related to R&D resources (national perspective, federal government, industry, universities/colleges) and S/E personnel (current supply and utilization patterns of S/E population, doctoral scientists/engineers, dynamics of S/E labor market) are provided in an appendix. (Author/JN)

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(Continued on inside back cover.)

foreword

Sustained economic expansion depends, in large part, on scientific and technological developments that provide opportunities for business investment and increased capital and labor productivity. It is important, therefore, that this Nation maintain and support a strong science and technology base. Each sector of the economy — government, industry, academia, and other nonprofit institutions — plays a vital and unique role in this endeavor. The National Science Foundation, in attempting to monitor the health of U.S. science and technology, assembles and analyzes comprehensive measures of the financial and human resources that each of these sectors devotes to scientific and technological activities. This annual report presents a concise but comprehensive summary of this type of science and technology information.

This publication complements the National Science Board's *Science Indicators* and *Science and Engineering Personnel: A National Overview* developed by the Division of Science Resources Studies. The 1982 data presented in this current report reflect the February 1982 proposed R&D programs contained in the Federal 1983 budget.

The Division of Science Resources Studies, which is responsible for the generation of these reports, continuously seeks suggestions for their improvement from the user community. Comments on possible improvements will be greatly appreciated and will help in the development of future reports.

Charles E. Falk
Director, Division of Science
Resources Studies
Directorate for Scientific,
Technological, and International
Affairs

March 1982

acknowledgments

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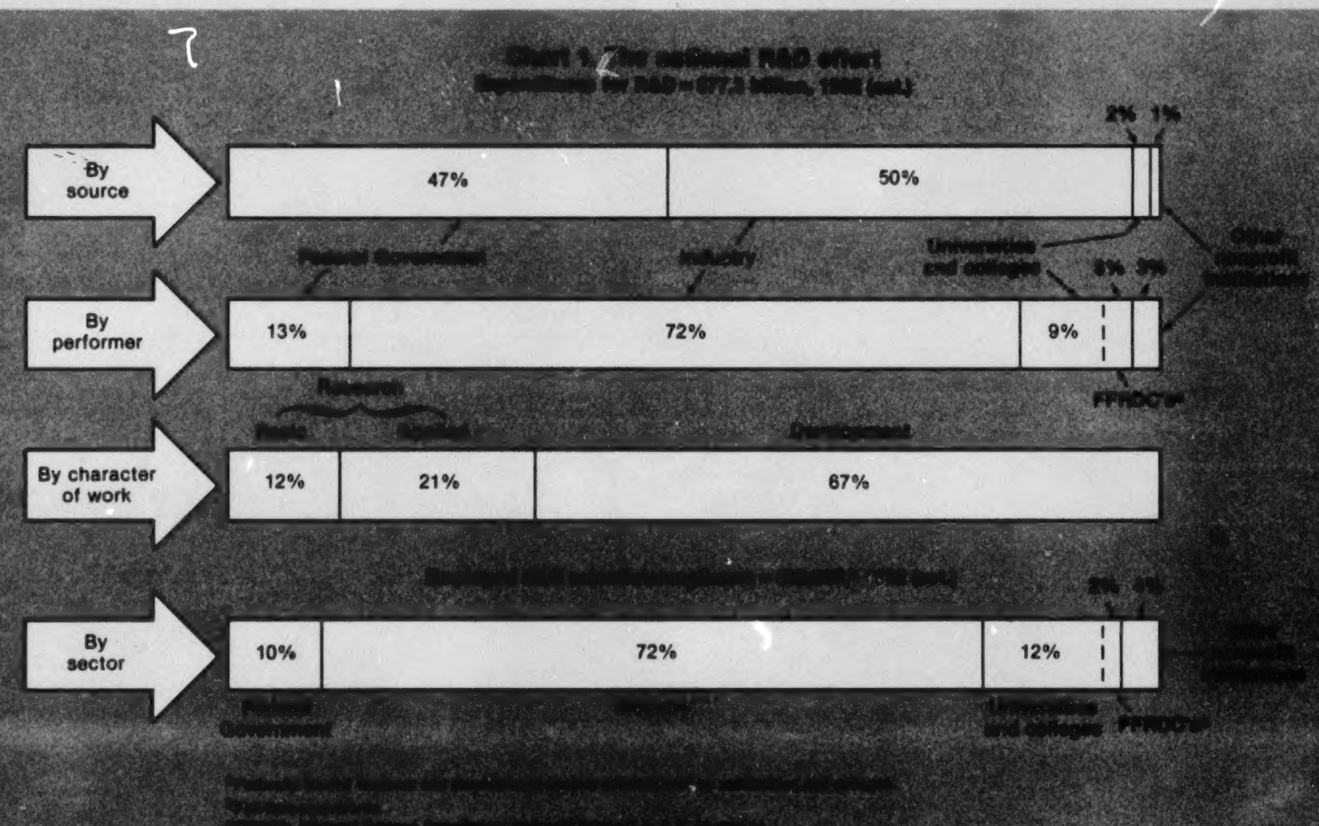
summary

r&d resources

Recent trends in the growth of the Nation's overall level of R&D activity are expected to slow somewhat in 1982. There is also evidence of change in the nature of U.S. research and development. In 1981 Federal R&D support began to shift toward defense and away from civilian areas, particularly health. Furthermore, basic research activity, as measured by constant dollar expenditures, is projected to drop in 1982, the second decline in as many years.

Total expenditures for research and development in the United States reached an estimated $69.8 billion in 1981, 12 percent more than the total in 1980, or an increase of 3 percent in constant dollars.[1] Between 1975 and 1981, U.S. research and development increased by more than 25 percent in real terms, largely as a result of increases in Federal R&D funds for defense, space, and energy, and from industrial R&D growth.

In 1982, the Nation is expected to invest $77.3 billion on R&D activities (chart 1), 11 percent more than in 1981, or an increase of 3 percent in constant dollars. Both Federal and non-Federal sources of R&D funding are expected to increase: Federal



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[1] In the absence of a reliable R&D cost index, the implicit price deflator for the GNP has been used to convert R&D expenditures to constant dollars. The GNP deflator includes the effects of price changes for all goods and services in the economy and, therefore, can only indicate approximate changes in costs of inputs specifically related to R&D performance. The increase in the GNP deflator between 1980 and 1981 was 9 percent.

R&D growth is expected in defense; non-Federal R&D growth is expected primarily in industry.

The proportion of national R&D expenditures to the gross national product (GNP) has been increasing slightly each year since 1977, from 2.2 percent to an estimated 2.4 percent in 1981, where it is expected to remain through 1982. The increases in the ratio since 1977 reflect lower rates of increase in the Nation's GNP (chart 2) as compared to those in R&D spending.

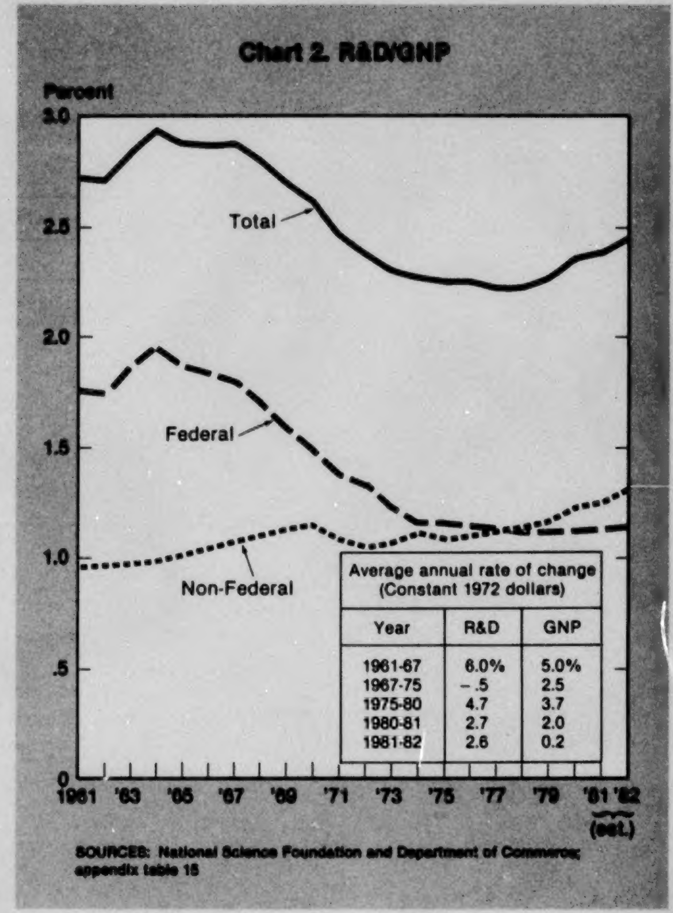
The United States spends more money annually on R&D activities than any other nation and twice the amount spent by the other major Western countries and Japan combined. Relative to the GNP, U.S. R&D expenditures have been equal to those of West Germany since the early seventies, with the United Kingdom (2.1 percent) and Japan (2.0 percent) close behind. In recent years, however, the rate of increase in R&D funding in the United States has been somewhat higher than the rate in West Germany and the U.S.S.R. and comparable to the rate in Japan and France. When civilian (nondefense and nonspace) R&D expenditures are compared to the GNP, the ratio in the U.S. (1.6 percent) is lower than that in West Germany (2.2 percent) and Japan (1.9 percent).

The full-time-equivalent (FTE) employment of scientists and engineers engaged in R&D activities is expected to approach 700,000 in 1982 — a 4-percent increase over the 1981 figure. In the past 10 years the number of FTE R&D scientists and engineers has increased by some 35 percent, primarily in the industrial sector. This industrial growth reflects, in large part, increased emphasis on energy since the midseventies and, more recently, on defense and space-related activities.

The Federal Government was the source of nearly one-half of the national R&D total in 1981 — $32.9 billion. This total was 11 percent more than in the previous year, or 2 percent in constant dollars. Increases in defense R&D spending between 1980 and 1981 were primarily responsible for the growth. In 1982, Federal R&D support is expected to increase 10 percent to $36.1 billion, reflecting increased defense spending for the second straight year.[2] Non-Federal R&D spending is expected to increase 13 percent in 1981 and 12 percent in 1982, when it will reach $41.2 billion. In real terms, the 1982 increases are estimated at 2 percent for Federal R&D spending and 3 percent for non-Federal R&D spending.

In 1981, national spending for basic research was estimated at $8.8 billion, a 9-percent increase over 1980, or level in constant dollars; spending for applied research was estimated at $15.2 billion, also a 9-percent increase; and spending for development was estimated at $45.8 billion, a 14-percent increase (chart 3), or 4 percent in real terms. Expected increases in these areas for 1982 are 6 percent, 9 percent, and 12 percent, respectively. Only development is expected to show a real-term increase between 1981 and 1982. The slower rate of growth in national basic research spending reflects primarily real-term decreases in Federal nondefense areas. Non-Federal support of basic research is expected to show a 2-percent real increase between 1981 and 1982.

Chart 2. R&D/GNP



Average annual rate of change (Constant 1972 dollars)

Year	R&D	GNP
1961-67	6.0%	5.0%
1967-75	−.5	2.5
1975-80	4.7	3.7
1980-81	2.7	2.0
1981-82	2.6	0.2

SOURCES: National Science Foundation and Department of Commerce; appendix table 15

The Federal Government has continued to support nearly70 percent of the Nation's basic research each year, one-half of which is spent in universities and colleges to advance the frontiers of scientific knowledge and to help train future scientists and engineers. The Federal Government also supports about 45 percent of the Nation's applied research and development each year. The bulk of this support goes to industry or Federal intramural laboratories.

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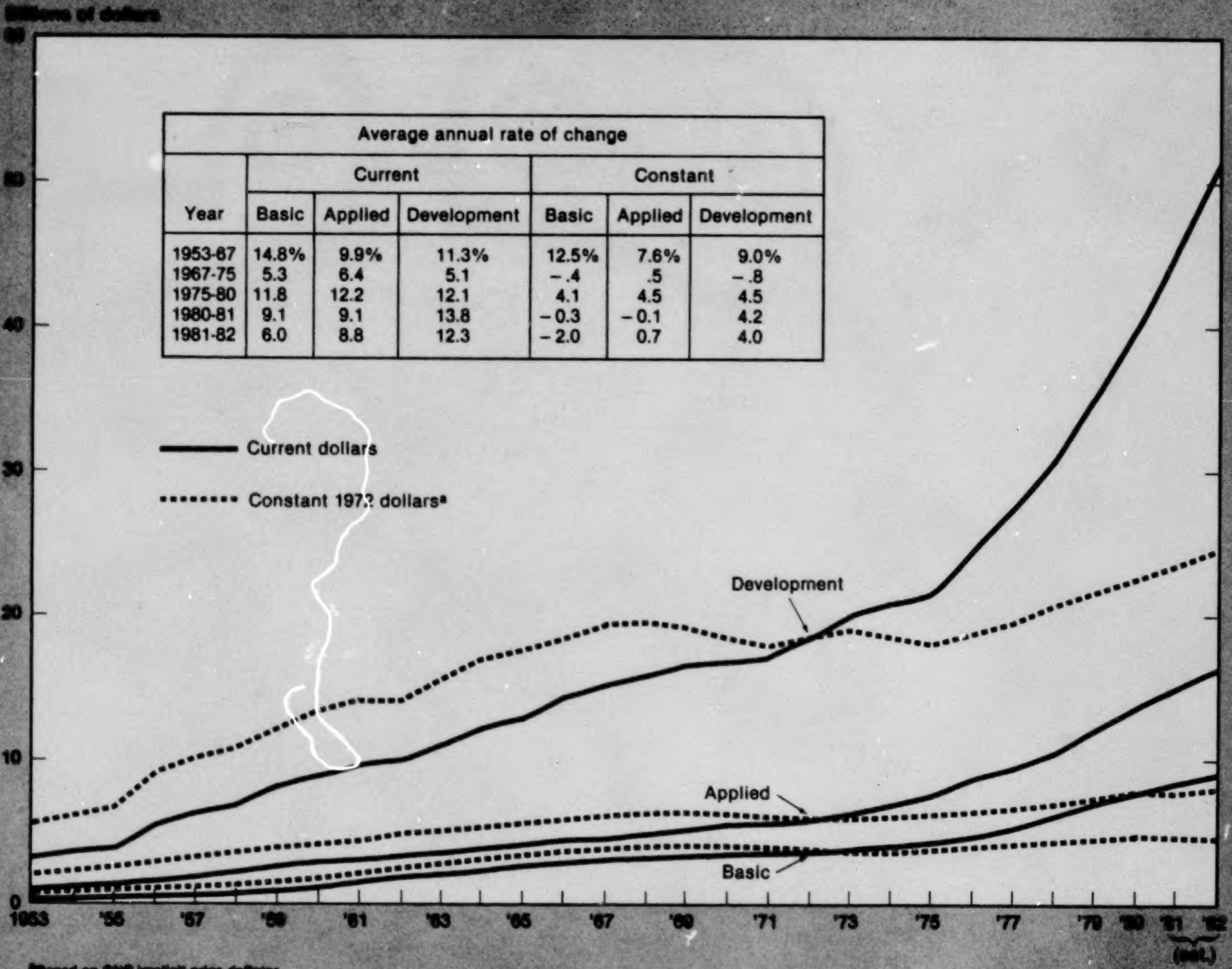
[2] Office of Management and Budget, "Special Analysis K," *The Budget of the United States Government Fiscal Year 1983*, (Washington, D.C.: Supt. of Documents, U.S. Government Printing Office, 1980).

Chart 3. National R&D spending by character of work



Average annual rate of change						
	Current			Constant		
Year	Basic	Applied	Development	Basic	Applied	Development
1953-67	14.8%	9.9%	11.3%	12.5%	7.6%	9.0%
1967-75	5.3	6.4	5.1	−.4	.5	−.8
1975-80	11.8	12.2	12.1	4.1	4.5	4.5
1980-81	9.1	9.1	13.8	−0.3	−0.1	4.2
1981-82	6.0	8.8	12.3	−2.0	0.7	4.0

^a Based on GNP implicit price deflator.

SOURCE: National Science Foundation; appendix tables 7, 9, and 11

scientists and engineers

Labor market indicators show shortages of engineers and computer specialists and adequate supplies of other scientists. In 1980, nearly all scientists and engineers were in the labor force, with only about 1 percent unemployed. About 12 percent of those employed held jobs outside of science or engineering; however, most of this employment (about 90 percent) reflects voluntary choices (e.g., career advancement or better pay) rather than a perceived lack of science and engineering (S/E) job opportunities.

Between 1978 and 1980, employment of scientists and engineers in both technical and nontechnical jobs increased more rapidly than total U.S. employment (9 percent versus 3 percent). Fueled largely by the growth in demand for computer specialists and life scientists, employment of scientists increased more rapidly than employment of engineers (11 percent versus 6 percent). Growth in engineering employment, however, may have been inhibited by supply constraints. Among scientists, above average increases were found for mathematical and life scientists and computer specialists; among engineers, above average increases were noted for aeronautical, chemical, and electrical engineers (chart 4).

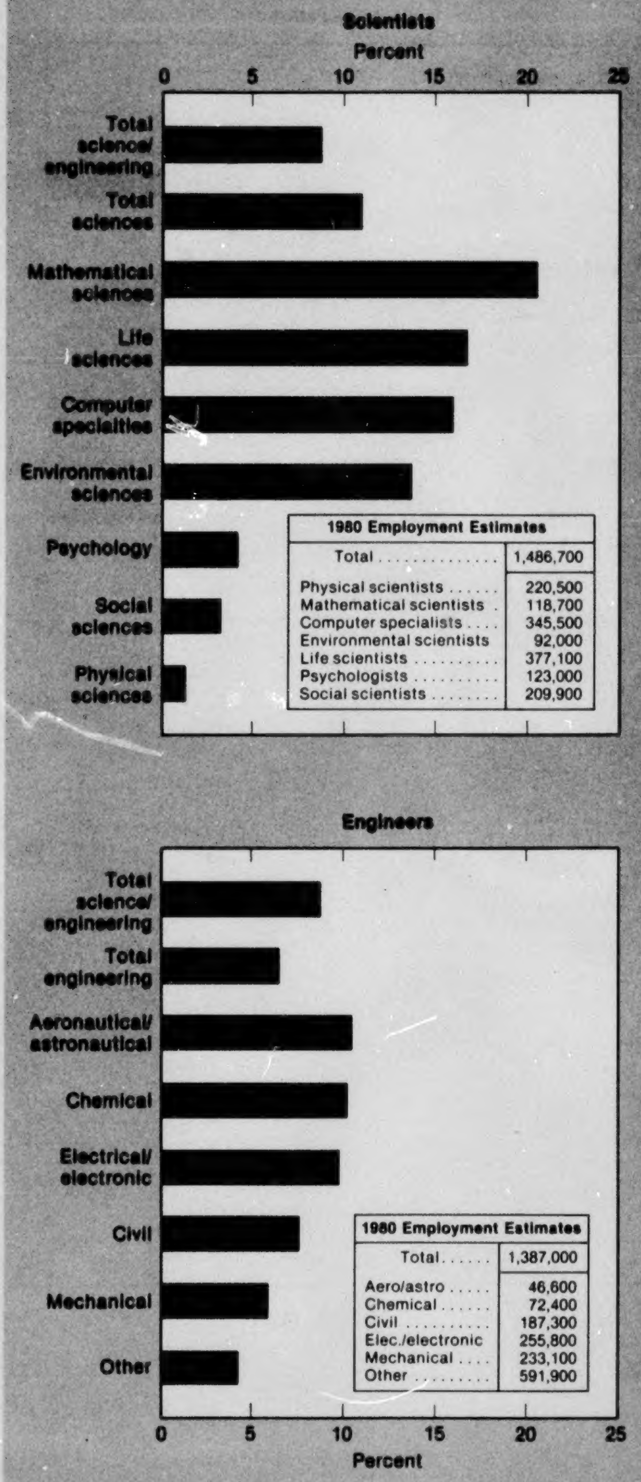
Research and development was the primary work activity of about 28 percent of the Nation's scientists and engineers in 1980, with engineers more likely than scientists to be primarily engaged in some aspect of research and development (30 percent versus 25 percent). Between 1978 and 1980, the number of scientists and engineers reporting research and development as their primary work activity increased by 14 percent, compared with a 11-percent increase between 1976 and 1978.

Labor market conditions for doctoral scientists and engineers remained favorable in the late seventies. Most were in the labor force, and less than 1 percent were unemployed in 1979. In addition, fewer than 10 percent of those employed held jobs outside of science or engineering, most for voluntary reasons.

Ph.D. employment continued to shift away from educational institutions and the Federal Government toward industry (chart 5). Nonetheless, educational institutions are still the major employer (55 percent in 1979) of doctoral scientists and engineers. Within educational institutions, the proportion of doctoral scientists and engineers reporting teaching as their primary work activity has declined sharply, while the proportion reporting either basic or applied research has increased.

The future supply of scientists and engineers depends on a number of factors, including the number of new entrants to the S/E labor force. New entrants to this labor force are drawn primarily from recent S/E graduates. In 1980, about 290,000 bachelor's degrees were granted in science and engineering, roughly 4 percent below the number awarded in the peak year of 1974. This decline includes a substantial drop in the number of social science bachelor's degrees. The number of engineering baccalaureates awarded increased significantly during this period a 10-percent decline between 1974 and 1976 was followed by an increase of over 50 percent between 1976 and 1980. Annual production of master's degrees in S/E fields has remained relatively stable at about 55,000 since 1972, while the annual

Chart 4. Change in employment of scientists and engineers by field: 1978-80

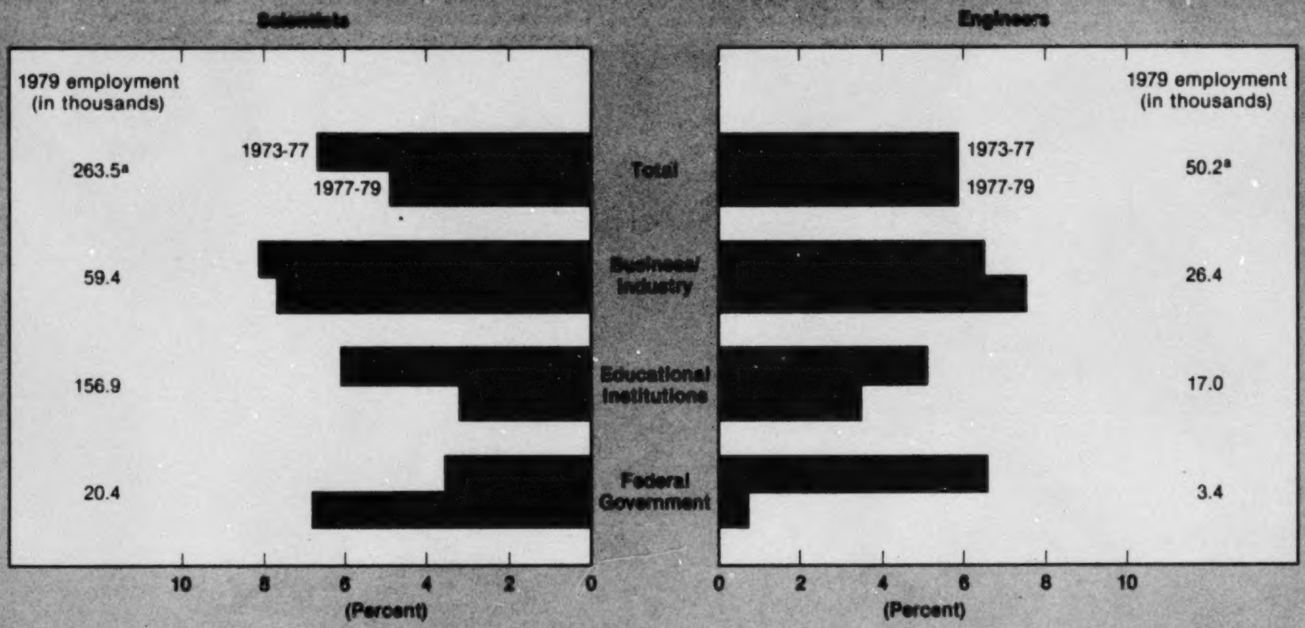


1980 Employment Estimates	
Total	1,486,700
Physical scientists	220,500
Mathematical scientists	118,700
Computer specialists	345,500
Environmental scientists	92,000
Life scientists	377,100
Psychologists	123,000
Social scientists	209,900

1980 Employment Estimates	
Total	1,387,000
Aero/astro	46,600
Chemical	72,400
Civil	187,300
Elec./electronic	255,800
Mechanical	233,100
Other	591,900

Source: National Science Foundation; appendix table 70

Chart 5. Doctoral science/engineering employment growth by sector; average annual growth rate: 1973-77 and 1977-79



ªIncludes "other sectors."
SOURCE: National Science Foundation; unpublished data

production of S/E doctorates has decreased by 6 percent since 1973 to slightly over 17,000 in 1980.

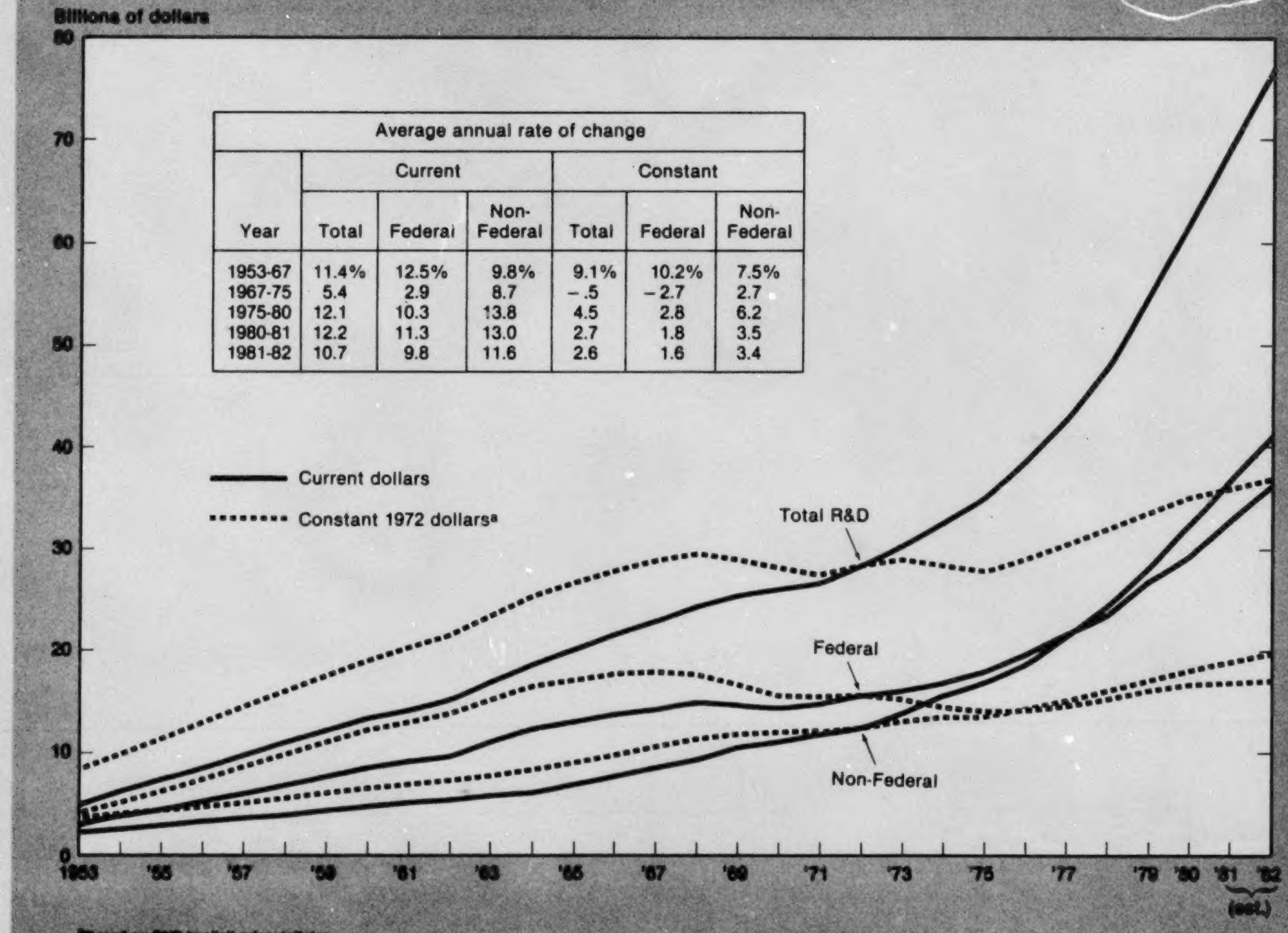
Women continue to increase their participation in S/E careers. Between 1978 and 1980, the female share of the S/E work force rose from about 10 percent to about 13 percent. Over half the increase occurred in the fields of computer specialties, engineering, and mathematical science. Despite this growth, however, women constituted less than 3 percent of all employed engineers in 1980 compared with over 20 percent of employed scientists. No strong trends were observed for any of the minority groups. Blacks were almost 2 percent of the S/E work force in 1980, and Asians constituted 2.5 percent. Women continue to increase their share of S/E degrees produced. At the bachelor's level, women received 36 percent of the S/E degrees, up from 26 percent in 1970. Similar trends are apparent for master's degree and doctorate holders in S/E fields.

national perspectives of r&d resources

the r&d effort and the national economy

In 1981, total R&D spending by four major sectors of the economy — Federal Government, industry, universities and colleges, and other nonprofit institutions — amounted to $69.8 billion, an increase of 12 percent over the 1980 level, or 3 percent in constant dollars. Based on the Office of Management and Budget (OMB) inflation estimate of 8 percent for 1982, R&D spending in that year is expected to increase an additional 11 percent to $77.3 billion, 3 percent in constant dollars (chart 6).

Chart 6. National R&D funding



Year	Average annual rate of change: Current Total	Current Federal	Current Non-Federal	Constant Total	Constant Federal	Constant Non-Federal
1953-67	11.4%	12.5%	9.8%	9.1%	10.2%	7.5%
1967-75	5.4	2.9	8.7	−.5	−2.7	2.7
1975-80	12.1	10.3	13.8	4.5	2.8	6.2
1980-81	12.2	11.3	13.0	2.7	1.8	3.5
1981-82	10.7	9.8	11.6	2.6	1.6	3.4

[a] Based on GNP implicit price deflator.

SOURCE: National Science Foundation; appendix table 5

The full time equivalents of 673,000 scientists and engineers were employed on R&D activities during 1981, 4 percent more than the previous year. In 1982, FTE R&D professional employment is expected to increase an additional 4 percent to 698,000. For every 10,000 persons in the total employed civilian labor force in 1980, 65 (FTE terms) were R&D scientists or engineers. The expected rise in R&D funding through 1982, combined with a relatively stable labor force, should result in an increase in this ratio through that year (chart 7).

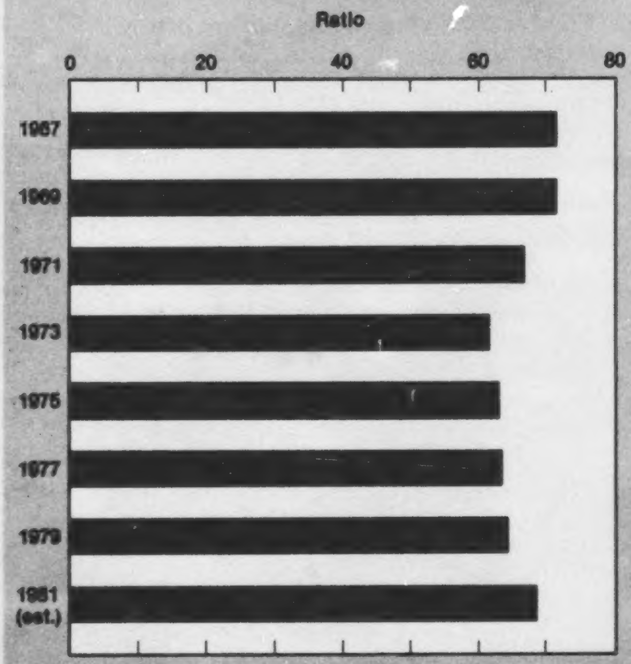
Following the oil embargo of 1974 and the recession that ended in early 1975, the Nation's R&D effort began a period of real-term growth that was heavily influenced by the search for solutions to the energy problem. This period of growth followed nearly a decade of virtually no real growth in the Nation's R&D funding. Between 1975 and 1980, national R&D expenditures increased in constant dollars at an average annual rate of 4.5 percent. Over this period, non-Federal R&D support increased at twice the rate of Federal R&D support (6 percent annually versus 3 percent).

The increases in non-Federal R&D activities were concentrated in industry, which accounted for one-half of the national R&D total in 1980. Industry's increased R&D spending over this 1975-80 period was due mainly to greater emphasis on fossil fuels and energy conservation, with the bulk of the financing coming from petroleum and electrical equipment firms. The increase in Federal R&D spending over this period, while partly the result of continuing expenditures in the defense and space areas, was also due to emphasis on energy-related fields, particularly nuclear energy development (chart 8).

The brief sharp recession during the first half of 1980 was accompanied by a sharp reduction in monetary growth and continued increases in the inflation rate. R&D budgets, which were mainly set prior to the onset of the recession, were not affected until later in the year and beyond. Real-term increases in R&D spending in 1981, for example, were 40 percent below the 1975-80 average annual growth (2.7 percent versus 4.5 percent).

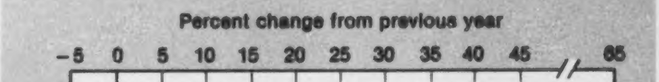
In addition, 1981 marked a change in Federal policies, as the first steps were taken toward a reorientation of the role of the Federal Government in the economy. The goal was to reduce the role of the Government in economic decisionmaking and to construct a long-term framework in which the private sector would be the key. A consequence of these changes would be a clear delineation between the responsibilities of the Government and the private sector with respect to R&D programs. Reflecting the new policy, Government R&D efforts are expected to shift toward defense through 1982, while the R&D efforts of the private sector are expected to continue to emphasize energy. The growth in national R&D funding in 1982 is expected to parallel that of the previous year. Resumption of the growth pattern of the 1975-80 period, however, is not expected to occur at least until the end of the current recession, which began in mid-1981.

Chart 7. R&D scientists and engineers per 10,000 employed civilian labor force



SOURCES: National Science Foundation and Department of Labor; appendix table 16

Chart 8. Changes in Federal and industry energy R&D funds (Based on 1972 constant dollar)

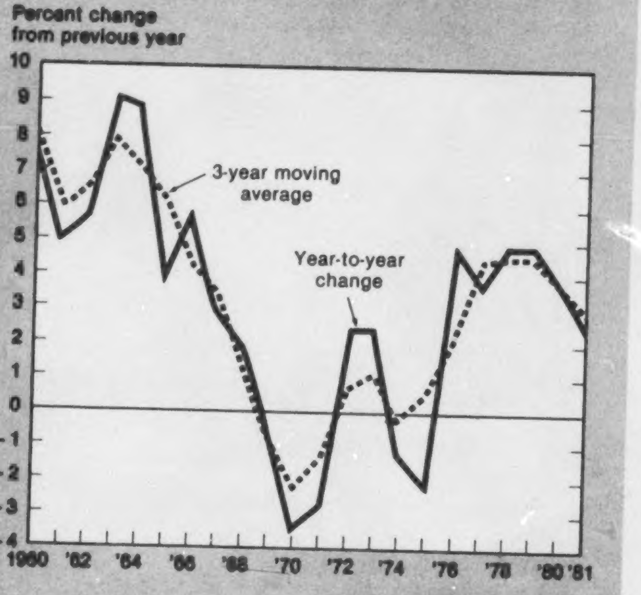


SOURCE: National Science Foundation; appendix tables 22 and 47

Examining year-to-year trends in R&D spending, however, may not always be the optimal way of analyzing changes in R&D activities. Since many R&D projects are conducted over periods exceeding one year, the funding of an R&D project in any year is dependent to some extent on the funding levels in previous years and could also have an impact on spending levels in future years. In these cases, an analysis of the 3-year moving average of R&D spending may be preferable.

As shown in chart 9, the trend in the 3-year moving average of national R&D expenditures is generally consistent with that of the year-to-year change. The 3-year moving average does, however, allow one to analyze the long-range trend in R&D spending without the distortion of year-to-year variations which may tend to conceal actual spending patterns.

Chart 9. Annual percent change in national R&D spending (Based on 1972 constant dollars)



SOURCE: National Science Foundation

r&d performance

Industry will continue to be the largest performer of research and development in both 1981 and 1982, with about 70 percent of the national R&D total. (See table on pages 10-11.) Industrial R&D performance has accounted for some 70 percent of the national effort since 1953, the first year that R&D statistics were collected. In 1981 and 1982, industrial R&D performance amounted to an estimated $49.6 billion and $55.7 billion, respectively, with both company and Federal funds increasing from 1980 at the same rates.

Between 1975 and 1980, company R&D funding increased at a faster average constant-dollar rate than did Federal R&D support of industry (6.3 percent annually versus 2.8 percent). According to interviews held with a number of industrial R&D officials, the increases in the use of company funds reflected, in part, a change in corporate strategy, which places greater emphasis on R&D activities as a source of future growth and new market opportunities. Other factors that contributed to the growth in company R&D spending included the national emphasis on energy conservation and development, as well as the Federal policies concerning regulations and minimum standards. These policies affect industry's R&D spending levels, particularly in areas such as food and drug production, environmental pollution, and public safety. For example, industry reported spending nearly $700 million in 1979 on R&D projects undertaken to meet existing Government regulations. At this time industry has not been able to assess the impact of the 1981 tax legislation on its future R&D activities.

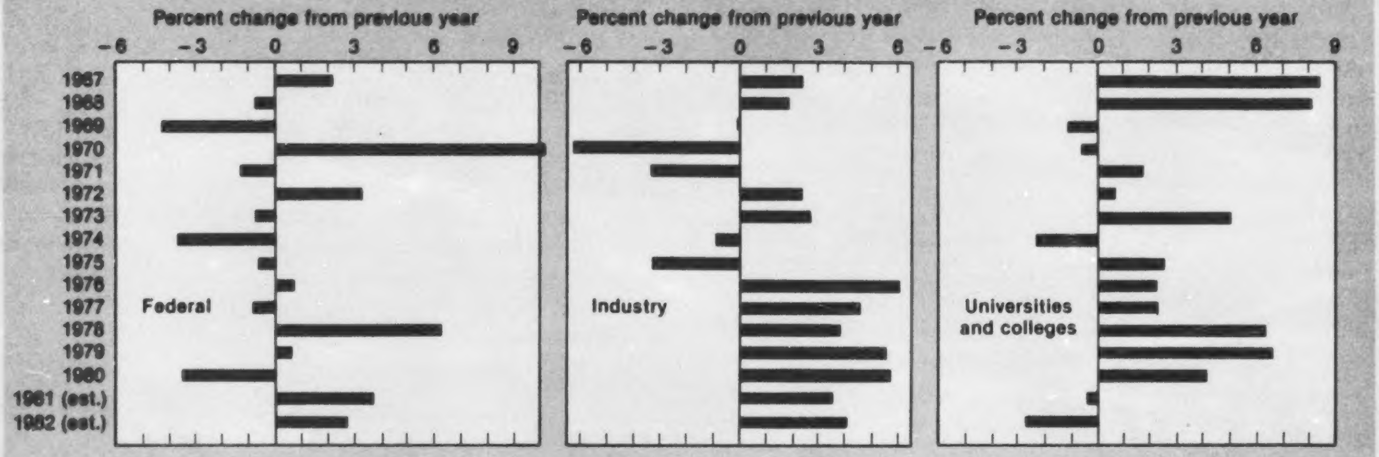
Historically, increases in the financing of R&D activities from company funds have generally kept pace with increases in company sales. The ratio between these two factors has remained relatively constant at 2.0 percent. In 1980 and 1981, however, the ratio climbed to 2.2 percent, reflecting both increased emphasis on research and development by industry as well as the lower-than-normal sales increases resulting from the recent recessions.

In the late sixties, the Federal Government provided nearly one-half of the money spent by industry for R&D performance. By the midseventies, as a result of cutbacks in defense and space, Federal support decreased to about 35 percent of total industry R&D spending. Federal support of industry R&D continued to decrease, but at a much slower rate, to 32 percent in 1980. The slower rate of decrease reflects increased Federal emphasis on energy. For 1981 and 1982, the Federal share is expected to remain at 32 percent, reflecting the shift in Federal emphasis back toward defense and space.

The Federal Government is the second largest R&D performer, with approximately 13 percent of the national total. In 1982, Federal R&D performance is expected to reach $10 billion, an 11-percent increase over 1981, or 3 percent in constant dollars (chart 10). Between 1972 and 1980, the level of real-term expenditures for Federal intramural R&D performance remained relatively constant. For 1981 and 1982, however, Federal R&D performance totals increased at an average annual rate of 3 percent, reflecting increased defense spending.

Universities and colleges account for an additional 12 percent of the national R&D effort. In 1982, university and college R&D performance is expected to approach $7 billion, a 5-percent increase over 1981, but a 3-percent drop in constant dollars. Between 1974 and 1981, university and college R&D performance increased by more than 25 percent. For 1981, academic R&D performance remained level in real terms before dropping 3 percent in 1982. This decrease reflects cutbacks in Federal funding, particularly in the health area. Agencies of the Federal Government fund about two-thirds of the R&D expenditures of universities and colleges.

Chart 10. National R&D spending by performer (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix table 6

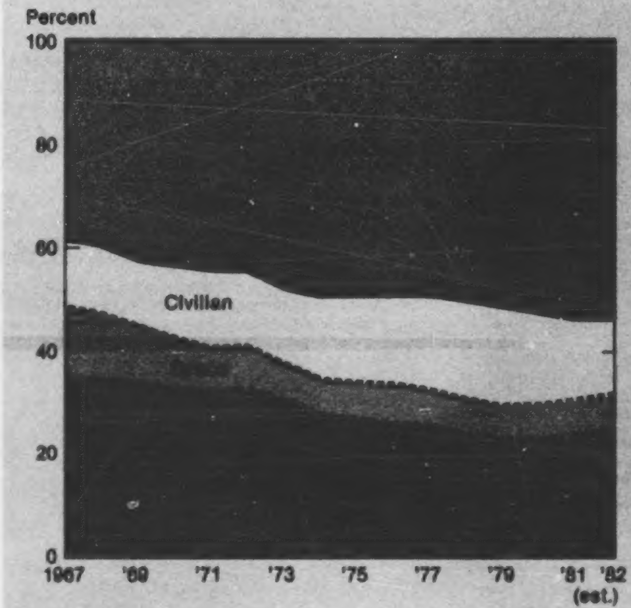
research and development by national objective

The area of greatest R&D spending has historically been defense (chart 11). In the early sixties, over one-half of the total national R&D effort was in this area. Over the next decade, however, Federal spending for defense research and development declined steadily, and industry funding in civilian areas increased. As a result, the defense share of the total R&D effort fell to less than 30 percent by the midseventies, and by 1980 it had dropped to less than 25 percent. The share is expected to increase after 1981 to 25 percent as a result of signficant recent Federal budget increases in defense R&D spending.

As shown in chart 12, 15 percent of the national R&D effort in 1982 is expected to be in Federal civilian-related areas, including general science, energy, and health. Between 1970 and 1980, R&D expenditures for energy and health increased from 2 percent and 7 percent of the Federal R&D effort, respectively, to more than 10 percent each. The energy R&D increases over this period covered spending for research on fusion, fossil fuels, solar and geothermal energy, and conservation; in health, the major increases went to cancer and heart research. The emphasis of the Federal R&D effort, however, is expected to shift away from the civilian areas and toward defense; as a result, energy and health R&D efforts are expected to show large real-term decreases in both 1981 and 1982.

Over one-half of the 1982 national R&D funding is expected to be provided by non-federal sources and 90 percent of this amount will come from industry's own funds. Industry support for energy research and development in 1982 is expected to show large increases over 1981 levels. From 1972, the first year for which data were available, through 1980, industrial R&D spending for energy has increased at an average annual rate of more than 15 percent in real terms.

Chart 11. National R&D spending by objective



SOURCE: National Science Foundation; appendix table 13

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1982 (estimated)

RESEARCH AND DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]		
Federal Government	10,000	17,800	4,600	2,350	1,375	36,125	46.7
Industry	——	[5]37,900	275	——	325	38,500	49.8
Universities and colleges	——	——	[5]1,600	——	——	1,600	2.1
Other nonprofit institutions	——	——	475	——	[5]585	1,060	1.4
Total	10,000	55,700	6,950	2,350	2,285	77,285	100.0
			9,300				
Percent distribution, performers	12.9	72.1	9.0	3.0	3.0		100.0
			12.0				

BASIC RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]		
Federal Government	1,425	350	3,150	850	445	6,220	66.7
Industry	——	[5]1,300	160	——	155	1,615	17.3
Universities and colleges	——	——	[5]975	——	——	975	10.5
Other nonprofit institutions	——	——	275	——	[5]245	520	5.6
Total	1,425	1,650	4,560	850	845	9,330	100.0
			5,410				
Percent distribution, performers	15.3	17.7	48.9	9.1	9.1		100.0
			58.0				

[1] All data are estimated from reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of their respective sectors. They are estimated to account for less than 5 percent and 15 percent, respectively, of the industry and nonprofit institutions performance totals. FFRDC's are organizations exclusively or substantially financed by the Federal Government to meet a particular requirement or to provide major facilities for research and training purposes.

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1982 (estimated) — Con.

APPLIED RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]		
Federal Government	2,775	2,100	1,200	725	445	7,245	43.8
Industry	——	[5]8,200	90	——	105	8,395	50.7
Universities and colleges	——	——	[5]520	——	——	520	3.1
Other nonprofit institutions	——	——	175	——	[5]220	395	2.4
Total	2,775	10,300	1,985	725	770	16,555	100.0
			2,710				
Percent distribution, performers	16.8	62.2	12.0	4.4	4.7		100.0
			16.4				

DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]		
Federal Government	5,800	15,350	250	775	485	22,660	44.1
Industry	——	[5]28,400	25	——	65	28,490	55.4
Universities and colleges	——	——	[5]105	——	——	105	.2
Other nonprofit institutions	——	——	25	——	[5]120	145	.3
Total	5,800	43,750	405	775	670	51,400	100.0
			1,180				
Percent distribution, performers	11.3	85.1	.8	1.5	1.3		100.0
			2.3				

[3] Includes agricultural experiment stations.

[4] Federally funded research and development centers (FFRDC's) administered by individual universities and colleges and by university consortia.

[5] Includes State and local government funds.

SOURCE: National Science Foundation

the r&/gnp ratio

Total U.S. R&D expenditures for research and development are expected to amount to 2.4 percent of the Nation's gross national product in both 1981 and 1982. This ratio peaked at 3.0 percent in the midsixties and gradually declined to 2.3 percent in 1973. The drop in the ratio over this period reflected Federal cutbacks in defense and space R&D programs.

The R&D/GNP ratio stabilized at 2.2. percent to 2.3 percent between 1973 and 1979, primarily as a result of increases in both Federal R&D efforts in energy. The recent recessions in 1980, 1981, and 1982 resulted in a slowdown in the real growth of the gross national product, and an increase in the ratio to 2.4 percent for those years.

basic research, applied research, and development

As shown in chart 3, between 1975 and 1980, national spending on basic research, applied research, and development increased at about the same annual average constant-dollar rate (4.2 percent for basic research and 4.5 percent each for applied research and development). The trend in Federal support of these three areas over this period has varied somewhat from non-Federal support. Federal support for basic research has increased in real terms at a faster rate than Federal support for applied research or development (4.2 percent annually versus 2.8 percent and 2.3 percent). Increases in non-Federal support were greatest in development (6.5 percent annually versus 3.8 percent for basic research and 6.2 percent for applied research). For 1981 and 1982, Federal constant-dollar increases are expected only in development, reflecting increased defense spending. Non-Federal support is expected to increase in all three areas.

Between 1975 and 1982, the Federal shares of intramural performance decreased from 20 percent to 16 percent for research and from 13 percent to 11 percent for development. Over the same period, industry's performance shares increased by corresponding amounts, reflecting the Federal Government's atttempt to contract more of its R&D work to industry to avoid Federal preemption of private sector efforts.

basic research

Total U.S. spending on basic research amounted to an estimated $8.8 billion in 1981, 9 percent above the 1980 level, and is expected to increase to $9.3 billion in 1982, 6 percent above the 1981 level. In real terms, national funding for basic research increased each year between 1975 and 1980, averaging 4 percent annually and reflecting an increased Federal commitment to basic research. By 1980, Federal support accounted for 70 percent of the national basic research total. This upswing contrasted sharply with the trend between 1968 and 1975, when a real-term decrease in Federal defense and space programs resulted in a 7-percent average annual drop in national basic research spending (chart 12).

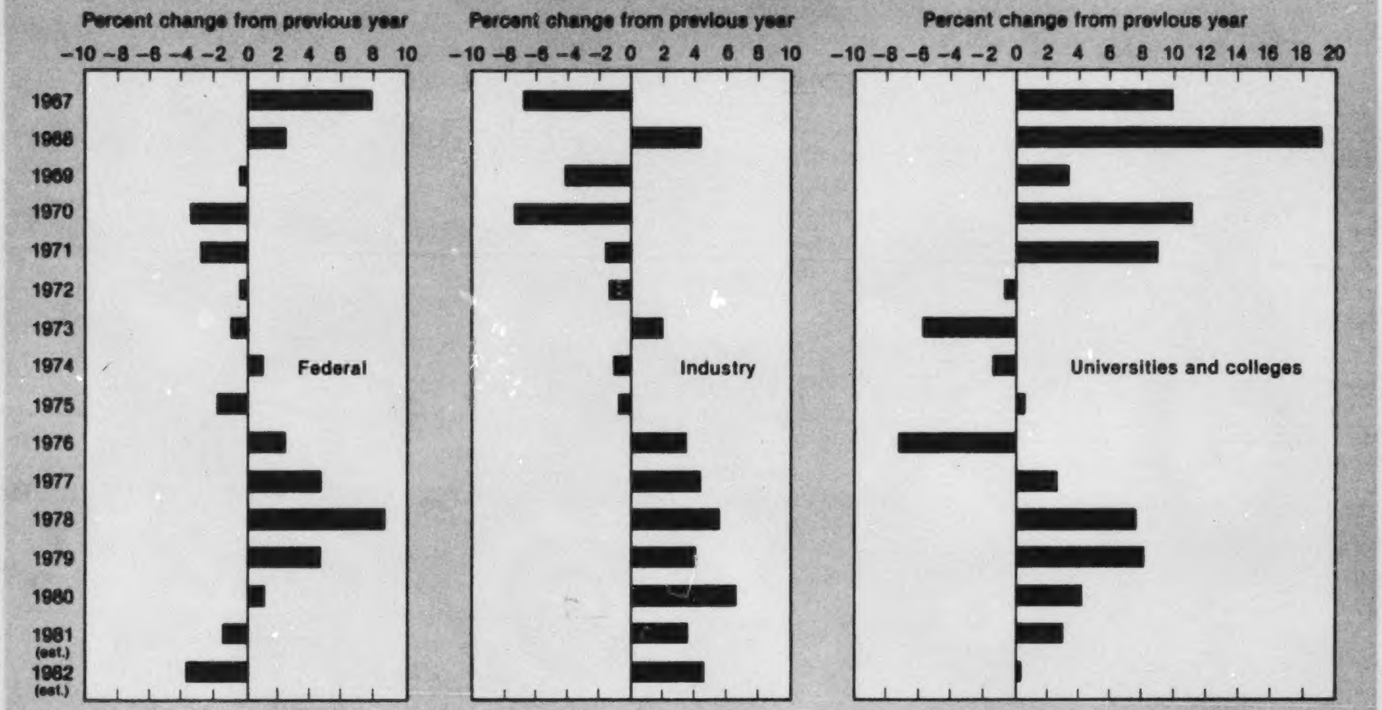
In 1981, real-term spending for basic research is expected to remain at about the same level before dropping an estimated 2 percent in 1982. This reversal of the 1975-80 trend reflects decreased Federal support of basic research in the health area. Between 1980 and 1982, Federal support for basic research is expected to decrease in constant dollars by more than 5 percent.

Industrial support of basic research is expected to amount to $1.6 billion in 1982, or 17 percent of the national basic research total. Between 1975 and 1980, industrial support for basic research increased at an average annual constant-dollar rate of 5 percent, directed chiefly to energy-related activities. This followed a 9-year period in which industrial spending for basic research fell at an average annual rate of 2 percent. In 1981 and 1982, real-term industry support of basic research is estimated to increase 4 percent each year. It is expected that these increases will continue to be directed toward energy programs.

Universities and colleges are expected to spend $975 million of their separately budgeted non-Federal funds on basic research in 1982, an increase of 8 percent over 1981. In real terms, the funding will remain at the same level between the two years. In contrast, between 1976 and 1981, university support for basic research increased by nearly 30 percent in constant dollars.

In terms of performance, universities and colleges spend about one-half of all basic research funds in the Nation, with two-thirds of the support provided by the Federal Government. In 1982, universities and colleges are expected to perform basic research totaling $4.6 billion, 4 percent more than in 1981. Federal support for basic research in universities and colleges is estimated to increase 2 percent between 1981 and 1982, while non-Federal support is estimated to increase 8 percent. Industry is expected to increase its basic research performance by 12 percent between 1981 and 1982 to $1.7 billion. It is expected that industrial basic research performance will continue to be influenced by energy concerns at least through that year.

Chart 12. National basic research spending by source (Based on constant 1972 dollars)



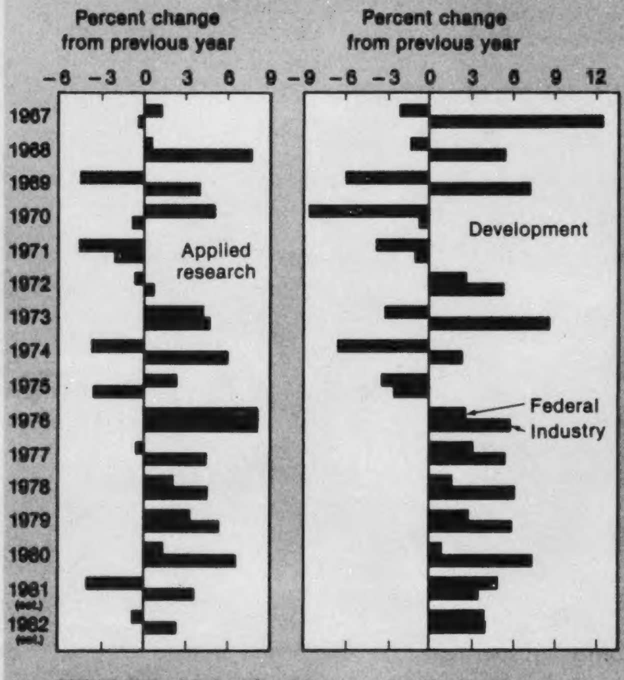
SOURCE: National Science Foundation; appendix table 7

applied research

National expenditures for applied research are expected to reach $16.6 billion in 1982, 9 percent more than in the previous year. In real terms, national spending for applied research has increased an average of 4.5 percent each year between 1975 and 1980. This growth in applied research has been brought about mainly by increased industrial support (chart 13) and has been concentrated in energy-related areas. During this 5-year period, industrial support for applied research rose in real terms by 35 percent; Federal support, on the other hand, increased over the same period by 15 percent, reflecting a shift in Federal emphasis from applied to basic research. For example, between 1976 and 1980, all Federal agencies increased their spending for applied research in real terms except NASA, where spending for applied research decreased some 15 percent. Between 1980 and 1982, Federal support for applied research is expected to decrease 5 percent in constant dollars, and NASA support is expected to drop by more than 15 percent.

In terms of performance, two-thirds of the Nation's applied research is conducted in industrial laboratories. In 1982, performance in this area is expected to reach $10.3 billion, 10 percent more than in 1981. Federal intramural performance is expected to account for an additional 17 percent of the national applied research total, or $2.8 billion.

Chart 13. Applied research and development spending by source (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix tables 9 and 11

development

Due to high equipment and material costs, development is the most expensive area of R&D work. Industry tends to concentrate more on development than on research because of the short-term nature of the work and because it is closer to production and the marketplace. As a result, development activities account for about 80 percent of industry's total R&D performance and two-thirds of the total R&D dollars in the Nation. In 1981, development spending reached an estimated $45.8 billion, 14 percent above the 1980 level, or 4 percent in real terms. Development spending in 1982 is expected to reach $51.4 billion, an increase of 12 percent, or 4 percent in constant dollars. Industry and the Federal Government, which together account for 99 percent of this funding, have each increased real-term spending for development each year from 1975 through 1980 by an average of 6 percent and 2 percent, respectively. The intensified national emphasis on energy was a major factor behind these increases. In 1981 and 1982, both sources of funding are expected to show continued real growth. Industry is expected to continue to emphasize energy work, while the Federal Government will continue to increase its defense spending. Development is the only area of Federal support where real growth is expected in 1981 and 1982.

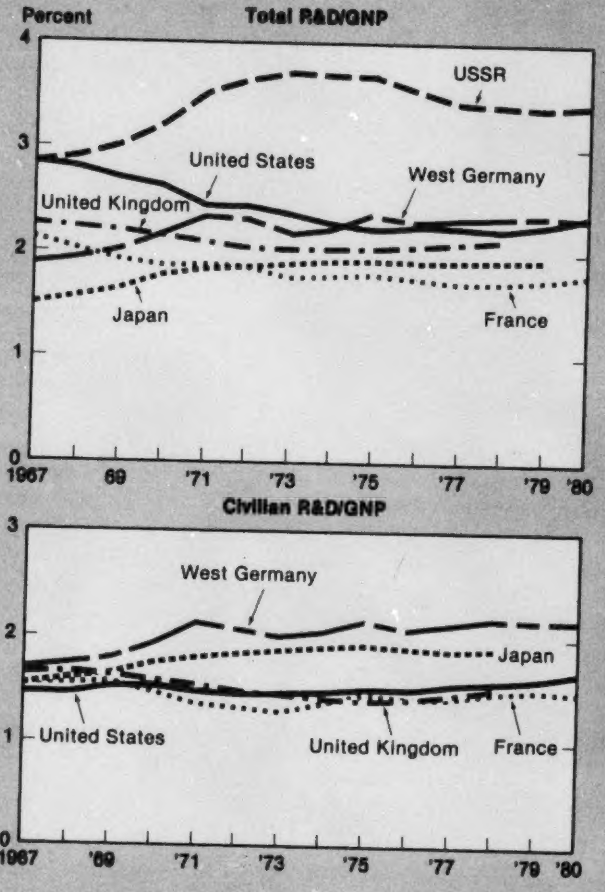
Industry and the Government account for 96 percent of development performance, with industry alone accounting for 85 percent of the total. Both sectors are expected to show real growth in development performance in both 1981 and 1982. Energy efforts and Government regulations and requirements are expected to influence the industry totals; increased defense spending is expected to influence the Federal performance levels as well as play a major role in the industrial development total for those years.

international comparisons

The relative emphasis that different countries place on R&D activities can be determined by two methods: by comparing R&D expenditures to the GNP, or by comparing the numbers of R&D scientists and engineers to the entire labor force. These ratios overcome difficulties of interpretation produced by inflation, different unit costs, and differences in size. Still, sufficient differences exist in the manner in which countries compile R&D data to require caution in making international comparisons, especially when using data for the U.S.S.R.[3]

The United States spends more on R&D activities than any other country. During the sixties, the United States had the highest R&D/GNP ratio — 3 percent in 1964 (chart 14). After 1964, the U.S. ratio declined because of cutbacks in Federal R&D spending for defense and space, whereas the ratios in other countries, notably the U.S.S.R., West Germany, and Japan, increased primarily because of large increases in government R&D funding. By the midseventies, the U.S. ratio, which had dropped to 2.3 percent, was exceeded by the U.S.S.R. ratio (3.7 percent) and equal to the West German ratio. Since that time, the ratios in all countries appear to have leveled off, although the U.S. ratio increased slightly in 1981 to 2.4 percent. This increase was due more to a real-term leveling trend in the U.S. gross national product than to significant growth in U.S. funding of research and development.

Chart 14. International R&D/GNP



SOURCES: National Science Foundation, Organization for Economic Cooperation and Development, and Robert Campbell (Indiana University); appendix tables 17 and 19

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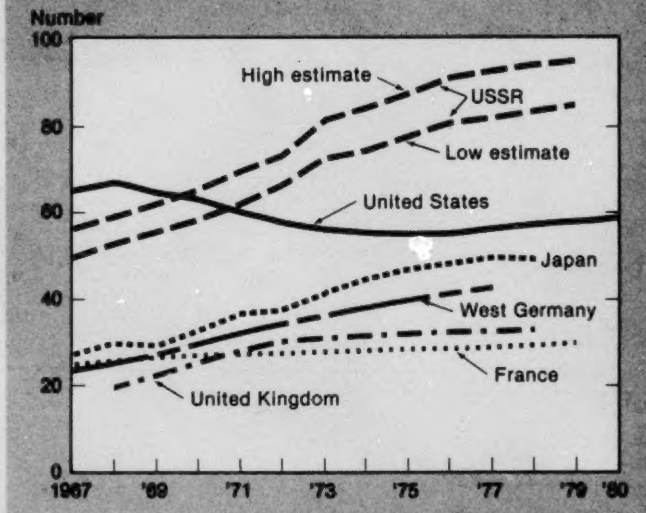
[3] Data regarding the U.S.S.R. should be treated as rough estimates because difficulties in Soviet R&D definitions and GNP accounting make international comparisons involving the U.S.S.R. difficult.

When nonspace civilian activities only are compared to the GNP, the ratio in the United States is lower than the ratio in some of the larger Western economies (1.6 percent in the United States vs. 2.2 percent in West Germany and 1.9 percent in Japan). Two-thirds of the U.S. R&D effort is spent on civilian activities as compared to 85 to 90 percent among the other major Western nations, where civilian R&D/GNP ratios have remained relatively constant since the early seventies to midseventies. In the United States, the ratio has increased as a result of the growing emphasis on energy. With U.S. R&D emphasis now shifting toward defense, however, this ratio is expected to decrease in the near term.

When the number of FTE R&D scientists and engineers is compared to the labor force, the resulting ratio in the United States is higher than that in all other Western countries and Japan. In the United States there are about 60 R&D professionals per 10,000 in the labor force. This ratio is exceeded only in the U.S.S.R, where about 90 R&D professionals are employed per 10,000 labor force (chart 15). The ratio in the United States dropped between 1968 and 1975, but has since begun to increase. The upward trend is expected to continue into the eighties because of the increased Federal emphasis on defense and the development by industry of alternative energy sources. The ratios in other countries have increased annually since the sixties.

Chart 15. International R&D scientists and engineers/10,000 labor force



SOURCES: National Science Foundation, Organization for Economic Cooperation and Development and Robert Campbell (Indiana University); appendix table 18

s/e personnel

trends in employment

Between 1970 and 1980, employment in S/E jobs increased by 38 percent (chart 16). Total nonagricultural employment increased 28 percent during this period, indicating that an increasing proportion of the nonagricultural work force is becoming engaged in scientific and technical activity. About 90 percent of the growth in S/E employment was linked to an increase in overall economic activity; in earlier periods (1950-70), only 50 percent of the increase in S/E jobs could be so attributed. Employment growth varied by field, with the number in science jobs increasing more rapidly than the number in engineering. Among science fields, the computer specialties field grew most rapidly, increasing by about 85 percent over the 1970-80 period.

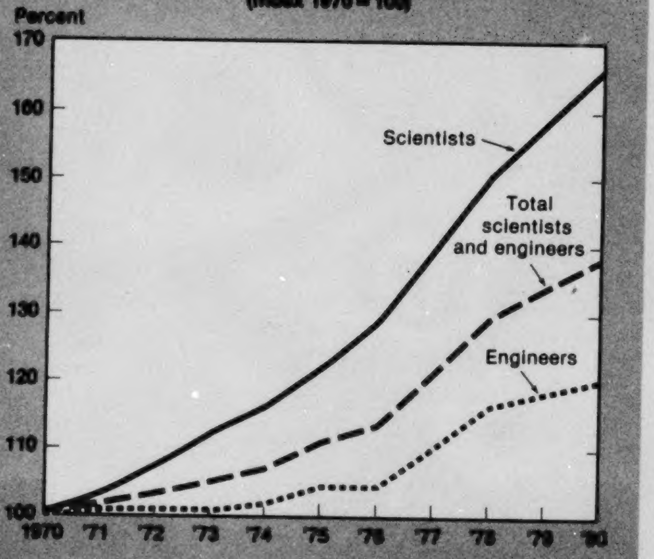
Almost 2.6 million scientists and engineers were working in S/E jobs in 1980. About one-half were engineers; of the 1.3 million in scientific occupations, about one-half were computer specialists (325,000) or life scientists (349,000) (chart 17).

S/E employment is concentrated in business and industry. About 70 percent of those holding S/E jobs in 1980 were in this sector, with engineers outnumbering scientists (951,000 versus 561,000). Over 75 percent of all engineers and over 40 percent of all scientists were in business and industry. Educational institutions employed 18 percent of those holding S/E jobs. In this sector, however, in contrast to the business sector, scientists outnumber engineers by more than 6 to 1. Educational institutions employed only 5 percent of all engineers, but 30 percent of all scientists.

The most frequently reported primary work activity of those holding S/E jobs is the performance of research and development (30 percent) (chart 18). Management or administration is the second most frequently reported (21 percent). Of those in management jobs, almost two-fifths were involved in the management of research and development. Thus, almost 40 percent of those in S/E jobs were involved in some aspect of research and development. The sectoral distribution of those in S/E jobs has remained relatively stable during the seventies.

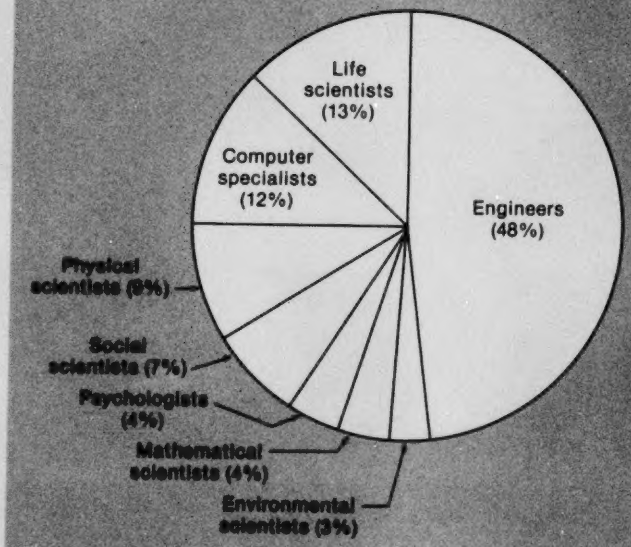
Chart 16. Trends in science/engineering employment: 1970-80

(Index 1970 = 100)



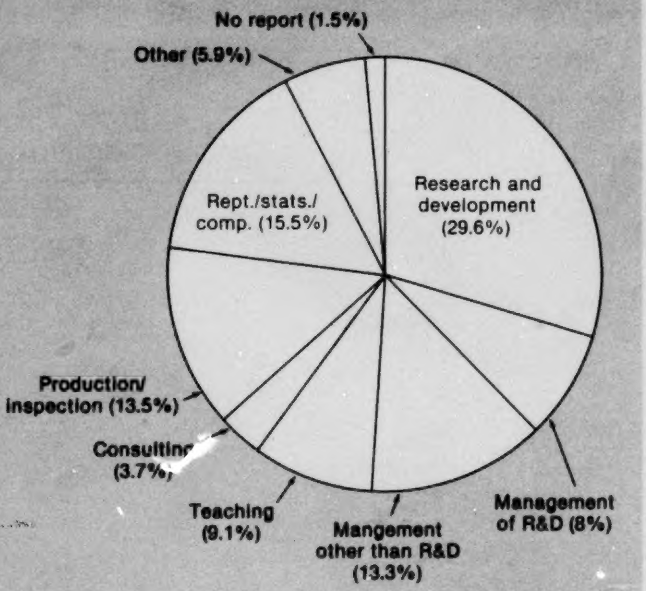
SOURCE: National Science Foundation, unpublished data

Chart 17. Field distribution of scientists and engineers employed in science/engineering jobs: 1980



SOURCE: National Science Foundation, appendix table 70

Chart 18. Distribution of those in science/engineering jobs by primary work activity: 1980



SOURCE: National Science Foundation, unpublished data

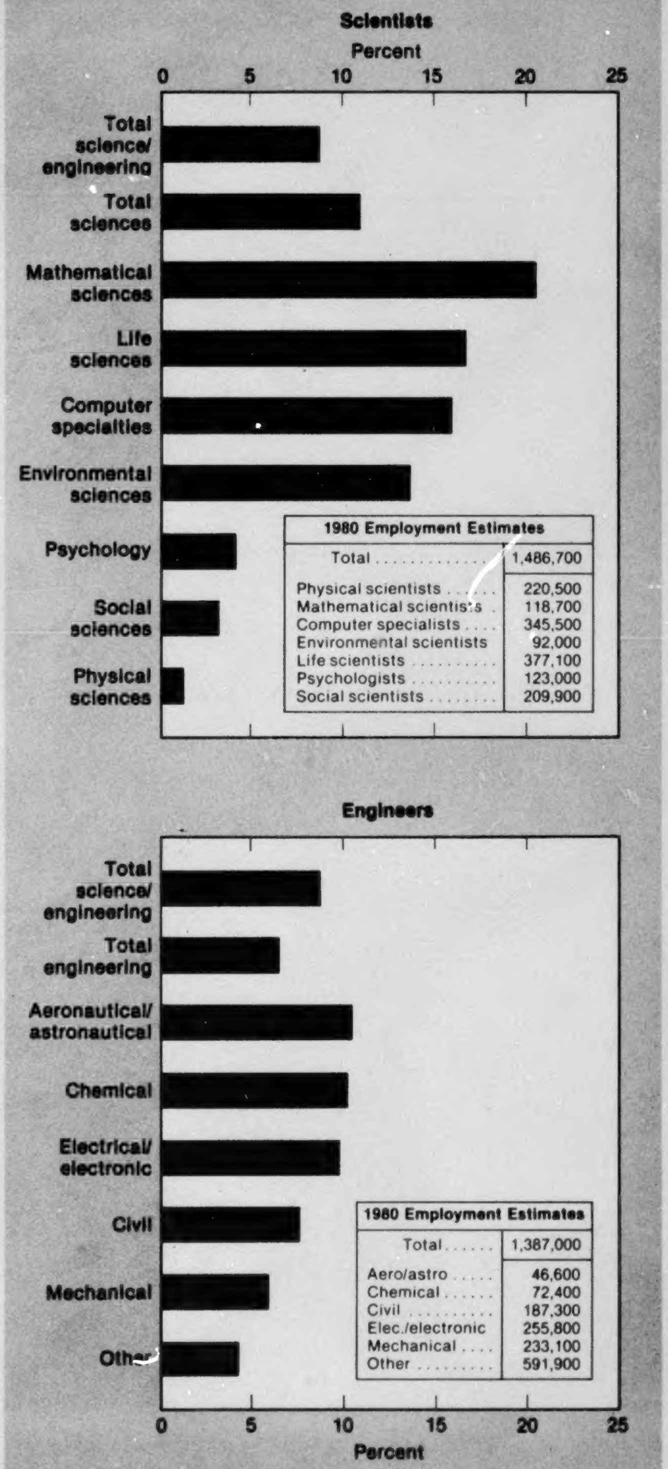
As a result of the rapid growth among computer specialists and life scientists, employment of scientists in S/E activity between 1978 and 1980 grew more rapidly than comparable employment of engineers (10 percent versus 3 percent). Above average increases in S/E employment were experienced by mathematical, environmental, and life scientists and computer specialists (chart 19). A 2.5-percent decline was noted for physical scientists. Among engineers, the largest growth rate was recorded for electrical/electronic engineers; the smallest was for "other" engineers. The slower growth rate for engineers may be the result of supply constraints — there may not have been enough qualified engineers to fill the available jobs.

s/e labor market balance

Scientists and engineers rarely experience much difficulty in finding employment, and this favorable situation continued in 1980. Of the 550,000 scientists and engineers who were not employed in S/E activity, most were either not in the labor force (and, therefore, were not looking for work) or were employed in non-S/E jobs (205,000 and 310,000, respectively).

The increases in employment in S/E activity between 1978 and 1980 were generally matched by increases in the supply of scientists and engineers. The unemployment rate for scientists and engineers remained at about 1 percent in 1978 and 1980, down from roughly 2 percent in 1976. In addition, the proportion of the S/E labor force employed in S/E jobs — the "S/E utilization rate" — remained at about 90 percent for the entire

Chart 19. Change in employment of scientists and engineers by field: 1978-80



1980 Employment Estimates	
Total	1,486,700
Physical scientists	220,500
Mathematical scientists	118,700
Computer specialists	345,500
Environmental scientists	92,000
Life scientists	377,100
Psychologists	123,000
Social scientists	209,900

1980 Employment Estimates	
Total	1,387,000
Aero/astro	46,600
Chemical	72,400
Civil	187,300
Elec./electronic	255,800
Mechanical	233,100
Other	591,900

Source: National Science Foundation; appendix table 70

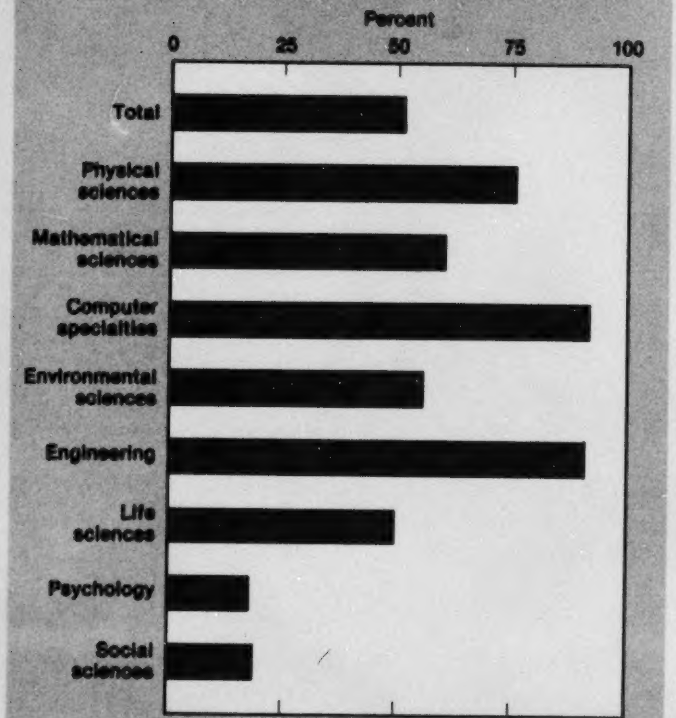
1976-80 period. Relatively few of those not employed in S/E activity (about 10 percent) had chosen other employment because they could not find S/E positions.

There was, however, notable variation by field in both the unemployment and the S/E utilization rates, particularly among science fields. Generally speaking, unemployment rates were higher (ranging around 2 percent), and S/E utilization rates were lower (in the 80- to 85- percent range) in science fields with relatively slow rates of employment growth — the social, physical, and environmental sciences. The field variation in the S/E utilization rates was even more dramatic for 1978 and 1979 graduates with baccalaureates in S/E fields (chart 20).

Shortages, however, were noted in industry and in some segments of academia. Industrial respondents to a mail and telephone survey sponsored by NSF in late 1981 reported shortages of persons trained in computer science, system analysis, and electrical, electronic, petroleum, and computer engineering. In most other engineering fields and in the earth sciences, respondents reported a balance between the supply of recent graduates and demand. Job applicants exceeded needs in physics, mathematics, chemistry, and civil engineering.

At the doctoral level, however, a large majority of industrial employers reported an adequate or surplus number of job applicants in the fields of computer science and earth science. On the other hand, some employers (about 40 percent) reported shortages of applicants in the chemical engineering field.

Chart 20. Science/engineering utilization rates for 1978-79 bachelor's degree recipients in 1980 by field



SOURCE: National Science Foundation, unpublished data

Industrial shortages were concentrated in those industries that had experienced overall employment growth in 1981: office machine (computer) manufacturing, electronic component manufacturing, computer and data processing services, and petroleum extraction.

Within the academic sector, unfilled faculty vacancies were reported in engineering and computer science departments. Unfilled vacancies in engineering amounted to about 10 percent of all faculty positions.

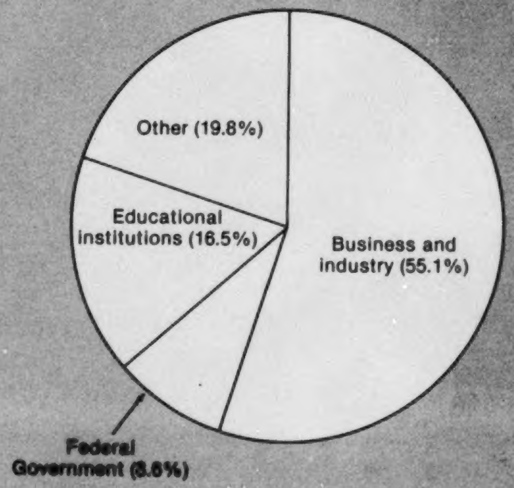
Based on these measures and other indicators of market conditions, shortages appeared to exist during 1980 and 1981 in markets for scientists and engineers with computer-related and some energy-related skills — e.g., computer specialists, electrical and petroleum engineers, and systems analysts. Some of these shortages may have eased since then, however, because of the decline in economic activity that began in late 1981 and continued through mid-1982.

sectoral patterns and trends

Most scientists and engineers continue to be employed in the industrial sector. In 1980, about 60 percent were in business/industry (chart 21).

Between 1978 and 1980, employment of scientists and engineers in both the industrial and academic sectors grew at an average annual rate of approximately 5 percent (chart 22). This represents a slowdown in the growth rate for the business/industry sector. Between 1976 and 1978 employment of scientists and engineers in industry grew at an average annual rate of

Chart 21. Distribution of employed scientists and engineers employed by economic sector: 1980



SOURCE: National Science Foundation, appendix table 71

10.8 percent. Between 1978 and 1980, employment of scientists and engineers in the academic sector increased slightly faster than between 1976 and 1978 (5.0 percent per year versus 4.4 percent per year). For the Federal Government, employment growth between 1978 and 1980 was slower than between 1976 and 1978.

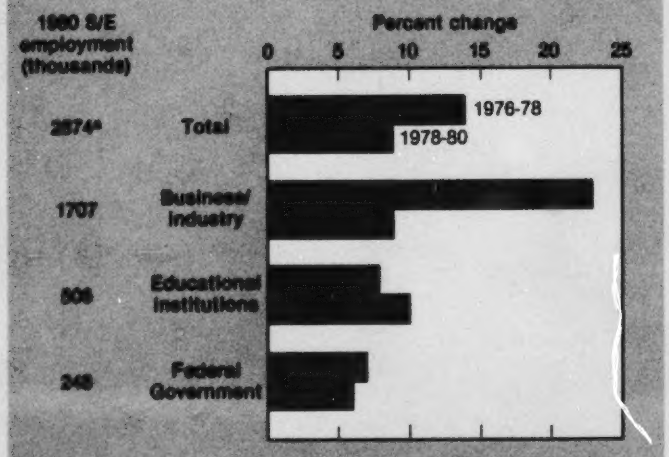
The slowdown in industrial employment was largely concentrated in engineering. In 1980, 63 percent of industrial S/E employment was accounted for by engineers. Engineering employment in business and industry increased by about 7 percent between 1978 and 1980. In contrast, employment of scientists in this sector grew by about 13 percent, with increases in life and mathematical scientists and computer specialists ranging between 17 percent and 27 percent.

Within the academic sector, employment of mathematical and life scientists showed the largest relative growth — more than 17 percent each — between 1978 and 1980. The growth in life sciences reflects, in part, substantial increases in funding for basic research in this field at universities and colleges. The growth in mathematical sciences is partially attributable to the rapid growth in enrollments in engineering and computer science curricula. Many mathematical scientists teach service courses in these programs.

Employment increases in the Federal Government between 1978 and 1980 were significantly slower than the increases in the other two sectors, and government employment of engineers increased much more slowly than employment of scientists (2 percent versus 8 percent). The slower growth of engineers may reflect, in part, the inability of the Federal Government to recruit and retain engineers because of the competitive pressures exerted by industry and universities.

Between 1978 and 1980, employment of those primarily working in research and development grew twice as rapidly as employment of those primarily involved in non-R&D activities (14 percent vs. 7 percent).

Chart 22. Science/engineering (S/E) employment growth by sector: 1976-80

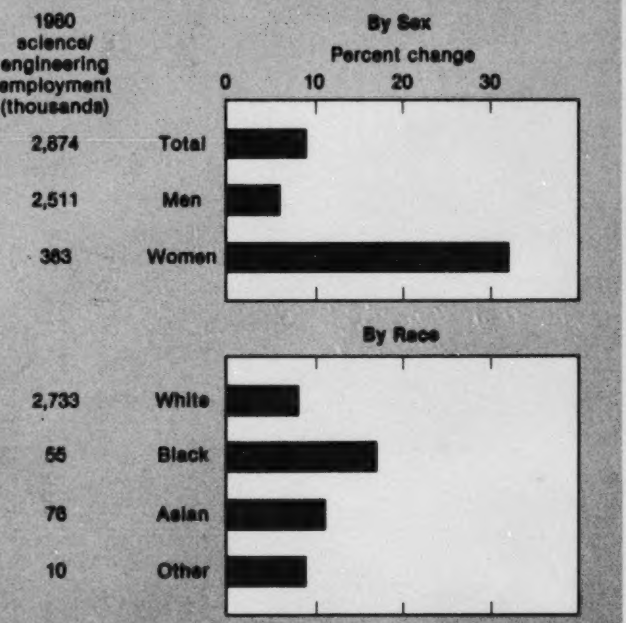


[a]Includes "all others" ([illegible]).
SOURCE: National Science Foundation; based on appendix table 71.

women and minorities

Women and minority scientists and engineers experienced above average improvements in employment opportunities between 1978 and 1980 (chart 23). Employment of women increased over five times faster than employment of men (32 percent versus 6 percent). Despite this faster growth in employment, women represented about 13 percent of all employed scientists and engineers. Employment of minority scientists and engineers grew faster than employment of whites. Between 1978 and 1980, employment of blacks increased 17 percent, employment of Asians increased 11 percent, and employment of whites increased approximately 8 percent. Despite higher growth rates, the black share of total S/E employment was only about 2 percent and the Asian share was only slightly over 2.5 percent.

Chart 23. Changes in employment of scientists and engineers: 1978-80



SOURCE: National Science Foundation; appendix tables 70 and 74

doctoral scientists and engineers

Among scientists and engineers holding doctorates, employment grew by over 10 percent in the late seventies, slightly faster than the 9-percent increase in total S/E employment. The growth of Ph.D. employment between 1977 and 1979 (5 percent per year) was slower than growth during the midseventies (over

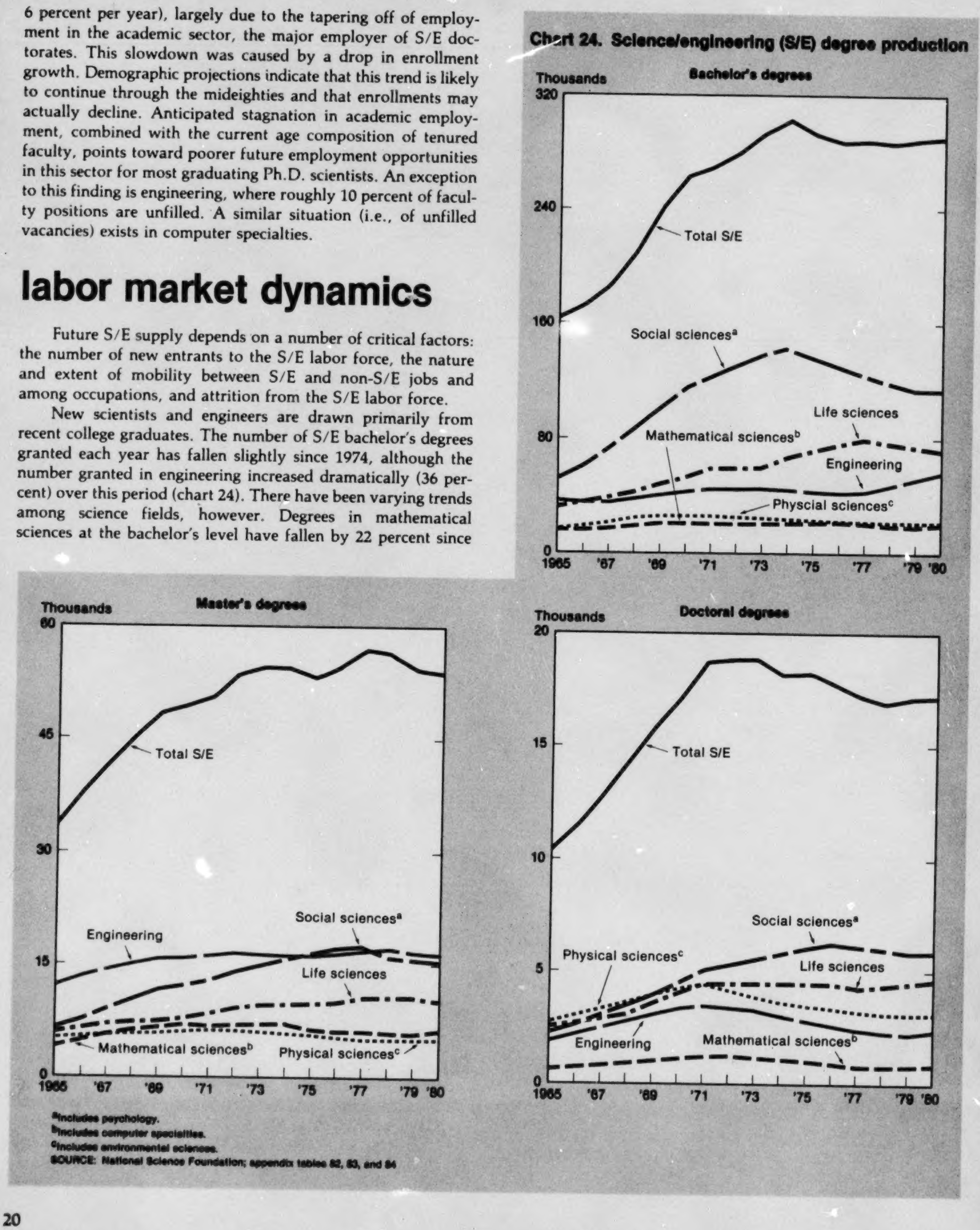
6 percent per year), largely due to the tapering off of employment in the academic sector, the major employer of S/E doctorates. This slowdown was caused by a drop in enrollment growth. Demographic projections indicate that this trend is likely to continue through the mideighties and that enrollments may actually decline. Anticipated stagnation in academic employment, combined with the current age composition of tenured faculty, points toward poorer future employment opportunities in this sector for most graduating Ph.D. scientists. An exception to this finding is engineering, where roughly 10 percent of faculty positions are unfilled. A similar situation (i.e., of unfilled vacancies) exists in computer specialties.

labor market dynamics

Future S/E supply depends on a number of critical factors: the number of new entrants to the S/E labor force, the nature and extent of mobility between S/E and non-S/E jobs and among occupations, and attrition from the S/E labor force.

New scientists and engineers are drawn primarily from recent college graduates. The number of S/E bachelor's degrees granted each year has fallen slightly since 1974, although the number granted in engineering increased dramatically (36 percent) over this period (chart 24). There have been varying trends among science fields, however. Degrees in mathematical sciences at the bachelor's level have fallen by 22 percent since

Chart 24. Science/engineering (S/E) degree production



[a] Includes psychology.

[b] Includes computer specialties.

[c] Includes environmental sciences.

SOURCE: National Science Foundation; appendix tables 82, 83, and 84

1970, but this conceals two divergent trends. Degrees in mathematics have fallen 58 percent, from over 27,000 in 1970 to 11,500 in 1980, while degrees in computer sciences have risen from 1,500 to over 11,000 during the same period. Degrees in social sciences, which increased spectacularly during the Vietnam Era, have fallen sharply since 1974. Within the social sciences, degrees fell in psychology (19 percent), sociology (47 percent), political science (17 percent), and "other" social sciences (21 percent), but increased in economics (24 percent). The relatively level trend in physical sciences masks a 39-percent decrease in physics since 1969 and an increase of more than 300 percent in the geological sciences since 1965. Annual production of S/E master's degrees has remained relatively stable since 1972, and the number of S/E doctorates granted annually has slowly decreased since 1973. Demographic and economic factors indicate that these trends are likely to continue in the near future (chart 25). The relatively stable numbers of master's degrees have masked slight declines in the physical and mathematical sciences and increases in the life and social sciences. Among those earning doctorates, the proportion earned in the life and social sciences increased, while the proportion in physical science, engineering, and mathematical sciences declined.

Mobility among S/E fields can alleviate S/E labor market imbalances. Moreover, such mobility can occur among recent entrants to the labor force or among more experienced workers. To illustrate, various labor market indicators show a strong demand for computer specialists, but there are not enough graduates in this field to fill the jobs available. Hence, graduates from other fields, primarily mathematics, find jobs as computer specialists. Of those who earned bachelor's degrees in science or engineering in 1978 and who were working as computer specialists in 1980, only 37 percent earned their degrees in the computer field. The remainder earned degrees not only in mathematics but in engineering, psychology, and the social sciences as well (chart 25).

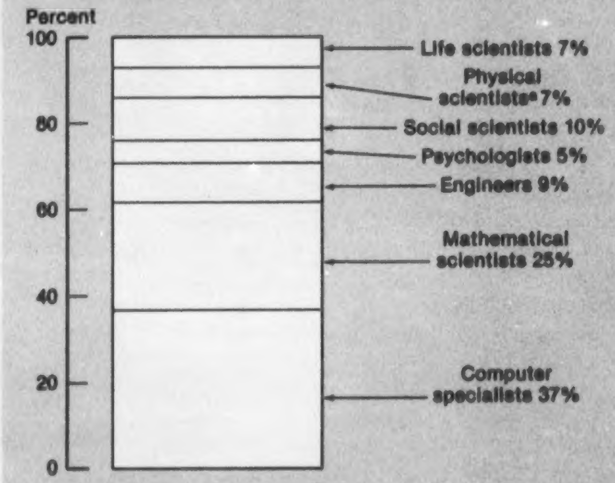
Similar mobility patterns occur among experienced scientists and engineers. The largest occupational movement among S/E specialties between 1972 and 1978 was out of mathematics, where demand was weak, into computer specialties and engineering, where demand was strong. By 1978, about 15 percent of those employed as mathematicians in 1972 had moved to these fields.

Mobility between S/E and non-S/E jobs can also alleviate S/E labor market imbalances. For example, of almost 175,000 persons employed in technical and related occupations other than science and engineering in 1972, more than 67,000 (35 percent) had entered S/E jobs by 1978 (the last year for which data are available). Offsetting this inflow, approximately 175,000 scientists and engineers working in S/E jobs moved either to managerial or other non-S/E jobs between 1972 and 1978.

Attrition from the S/E labor force because of death, retirement, or other reasons provides job openings even when S/E employment does not grow. An estimated attrition rate of less than 2 percent creates annual job openings currently for approximately 45,000 scientists and engineers.

Based on these flows, the outlook is for a continuation of overall supply increases — particularly through changes in the number of new S/E graduates. Whereas in science fields the decline in the number of new degrees portends a slowdown in the growth rate of supply, in engineering and computer specialties the relatively steady increase in the number of new degrees and the high employment rate for new graduates suggest that supply will continue to increase along with the growing demand for these skills.

Chart 25. 1978 Science/engineering baccalaureate graduates employed ascomputer specialists by field of degree: 1980



[a] Includes environmental scientists.

SOURCE: National Science Foundation; based on appendix table 85

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[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
			Source		Sources			Sources					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[5]	Total funds used	Federal Government	Industry	Universities and colleges[5]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[5]
1953	5,124	1,010	1,010	3,630	1,430	2,200	255	138	19	72	26	121	121	108	54	26	28
1960[6]	13,523	1,726	1,726	10,509	6,081	4,428	646	405	40	149	52	360	360	282	166	48	68
1965[7]	20,044	3,093	3,093	14,185	7,740	6,445	1,474	1,073	41	267	93	629	629	663	477	62	124
1966	21,846	3,220	3,220	15,548	8,332	7,216	1,715	1,261	42	304	108	630	630	733	525	70	138
1967	23,146	3,396	3,396	16,385	8,365	8,020	1,921	1,409	48	345	119	673	673	771	552	74	145
1968	24,605	3,494	3,494	17,429	8,560	8,869	2,149	1,573	55	390	131	719	719	814	582	81	151
1969	25,631	3,503	3,503	18,308	8,451	9,857	2,225	1,600	60	420	145	725	725	870	616	93	161
1970	26,134	4,079	4,079	18,067	7,779	10,288	2,335	1,648	61	461	165	737	737	916	649	95	172
1971	26,676	4,228	4,228	18,320	7,666	10,654	2,500	1,724	70	529	177	716	716	912	630	98	184
1972	28,477	4,590	4,590	19,552	8,017	11,535	2,630	1,795	74	574	187	753	753	952	653	101	198
1973	30,718	4,762	4,762	21,249	8,145	13,104	2,884	1,985	84	613	202	817	817	1,006	690	105	211
1974	32,864	4,911	4,911	22,887	8,220	14,667	3,023	2,032	96	677	218	865	865	1,178	822	115	241
1975	35,213	5,354	5,354	24,187	8,605	15,582	3,409	2,288	113	749	259	987	987	1,276	875	125	276
1976	39,016	5,769	5,769	26,997	9,561	17,436	3,727	2,512	123	808	284	1,147	1,147	1,376	925	135	316
1977	42,982	6,105	6,105	29,928	10,521	19,407	4,070	2,730	130	897	314	1,384	1,384	1,495	987	150	358
1978	48,295	6,920	6,920	33,365	11,209	22,156	4,621	3,057	170	1,035	359	1,717	1,717	1,672	1,100	165	407
1979	54,994	7,564	7,564	38,147	12,462	25,685	5,354	3,594	193	1,194	373	1,935	1,935	1,994	1,350	180	464
1980 (prelim.)	62,222	7,929	7,929	43,879	13,939	29,940	6,049	4,093	236	1,313	406	2,235	2,235	2,130	1,380	225	525
1981 (est.)	69,790	9,000	9,000	49,600	15,750	33,850	6,600	4,400	250	1,490	460	2,350	2,350	2,240	1,410	275	555
1982 (est.)	77,285	10,000	10,000	55,700	17,800	37,900	6,950	4,400	275	1,800	475	2,350	2,350	2,285	1,375	325	585

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Includes State and local government funds.

[6] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[7] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

Table 2. Transfers of funds expended annually for performance of basic research by sector, distributed by source: 1953, 1960, and 1965-82[1]

[Dollars in millions]

		Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other non-profit institutions[2] [4]			
			Source		Sources			Sources[5]					Source		Sources		
Year	Total	Total funds used	Federal Government	Total funds used	Federal Government	Industry[4]	Total funds used	Federal Government	Industry	Universities and colleges[6]	Other non-profit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other non-profit institutions[6]
1953	441	101	101	151	19	132	110	73	12	10	15	33	33	46	25	9	12
1960[7]	1,197	160	160	376	79	297	433	299	24	72	38	97	97	131	80	21	30
1965[8]	2,555	364	364	592	186	406	1,138	879	26	164	69	208	208	253	172	29	52
1966	2,814	385	385	624	173	451	1,303	1,008	27	197	71	227	227	275	185	32	58
1967	3,056	435	435	629	202	427	1,457	1,124	31	223	79	250	250	285	190	34	61
1968	3,296	432	432	642	180	462	1,649	1,251	36	276	86	276	276	297	197	37	63
1969	3,441	532	532	618	160	458	1,711	1,279	39	298	95	275	275	305	195	43	67
1970	3,549	577	577	602	158	444	1,796	1,296	40	350	110	269	269	305	189	44	72
1971	3,672	586	586	590	134	456	1,914	1,349	46	400	119	260	260	322	200	45	77
1972	3,829	625	625	593	130	463	2,022	1,420	53	415	134	244	244	345	214	47	84
1973	3,955	617	617	631	132	499	2,053	1,454	57	408	134	297	297	357	218	49	90
1974	4,248	705	705	699	163	536	2,154	1,523	61	432	138	285	285	405	246	54	105
1975	4,619	745	745	730	157	573	2,410	1,694	72	478	166	309	309	425	245	60	120
1976	4,987	797	797	819	185	634	2,548	1,841	71	474	162	359	359	464	265	64	135
1977	5,550	925	925	911	210	701	2,802	2,009	79	528	186	402	402	510	290	70	150
1978	6,399	1,040	1,040	1,035	250	785	3,172	2,282	79	603	208	567	567	585	335	80	170
1979	7,260	1,100	1,100	1,155	265	890	3,607	2,571	113	707	216	718	718	680	400	85	195
1980 (prelim.)	8,071	1,193	1,193	1,325	300	1,025	4,019	2,850	135	798	236	774	774	760	430	105	225
1981 (est.)	8,805	1,300	1,300	1,475	325	1,150	4,385	3,075	150	900	260	825	825	820	455	130	235
1982 (est.)	9,330	1,425	1,425	1,650	350	1,300	4,560	3,150	160	975	275	850	850	845	445	155	245

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

Table 3. Transfers of funds expended annually for performance of applied research by sector, distributed by source: 1953, 1960, and 1965-82[1]

[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
			Source		Sources			Sources[5]					Source		Sources		
		Total funds used	Federal Govern-ment	Total funds used	Federal Govern-ment	Industry[6]	Total funds used	Federal Govern-ment	Industry	Univer-sities and col-leges[6]	Other non-profit institu-tions	Total funds used	Federal Govern-ment	Total funds used	Federal Govern-ment	Industry	Other non-profit institu-tions[6]
1953	1,279	345	345	726	288	438	130	57	6	57	10	44	44	34	13	11	10
1960[7]	3,020	595	595	2,029	833	1,196	179	88	13	66	12	122	122	95	50	17	28
1965[8]	4,339	990	990	2,658	1,038	1,620	279	157	13	88	21	204	204	208	135	21	52
1966	4,601	997	997	2,843	1,039	1,804	328	194	13	89	32	207	207	226	145	24	57
1967	4,780	1,027	1,027	2,915	1,066	1,849	374	222	15	102	35	219	219	245	160	25	60
1968	5,131	1,110	1,110	3,124	1,043	2,081	404	264	16	87	37	231	231	262	172	28	62
1969	5,316	1,114	1,114	3,287	1,015	2,272	407	246	16	105	40	210	210	298	200	32	66
1970	5,720	1,327	1,327	3,427	1,049	2,378	427	268	16	98	45	216	216	323	220	33	70
1971	5,739	1,302	1,302	3,415	974	2,441	474	292	19	115	48	210	210	338	230	34	74
1972	5,984	1,360	1,360	3,514	982	2,532	524	320	18	140	46	221	221	365	251	35	79
1973	6,588	1,471	1,471	3,825	993	2,832	713	461	23	172	57	226	226	353	234	36	83
1974	7,219	1,565	1,565	4,288	1,025	3,263	736	438	29	203	66	217	217	413	280	40	93
1975	7,852	1,719	1,719	4,570	1,130	3,440	851	516	34	224	77	264	264	448	300	43	105
1976	9,034	2,082	2,082	5,112	1,200	3,912	1,015	584	43	282	106	327	327	498	330	48	120
1977	9,755	2,033	2,033	5,656	1,331	4,325	1,068	609	46	303	110	465	465	533	346	53	136
1978	10,833	2,181	2,181	6,300	1,430	4,870	1,213	673	56	354	130	549	549	590	385	55	150
1979	12,355	2,382	2,382	7,220	1,555	5,665	1,463	863	64	402	134	580	580	710	480	60	170
1980 (prelim.)	13,940	2,473	2,473	8,360	1,790	6,570	1,687	1,035	80	424	148	700	700	720	455	75	190
1981 (est.)	15,215	2,575	2,575	9,325	1,900	7,425	1,840	1,100	85	490	165	725	725	750	455	90	205
1982 (est.)	16,555	2,775	2,775	10,300	2,100	8,200	1,985	1,200	90	520	175	725	725	770	445	105	220

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

Table 4. Transfers of funds expended annually for performance of development by sector, distributed by source: 1953, 1960, and 1965-82[1]

[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
			Source		Sources			Sources[5]					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[6]	Total funds used	Federal Government	Industry	Universities and colleges[6]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[6]
1953	3,404	564	564	2,753	1,123	1,630	15	8	1	5	1	44	44	28	16	6	6
1960[7]	9,306	971	971	8,104	5,169	2,935	34	18	3	11	2	141	141	56	36	10	10
1965[8]	13,150	1,739	1,739	10,935	6,516	4,419	57	37	2	15	3	217	217	202	170	12	20
1966	14,431	1,838	1,838	12,081	7,120	4,961	84	59	2	18	5	196	196	232	195	14	23
1967	15,310	1,934	1,934	12,841	7,097	5,744	90	63	2	20	5	204	204	241	202	15	24
1968	16,178	1,952	1,952	13,863	7,337	6,526	96	68	3	17	8	212	212	255	213	16	26
1969	16,874	1,857	1,857	14,403	7,276	7,127	107	75	5	17	10	240	240	267	221	18	28
1970	16,865	2,175	2,175	14,038	6,572	7,466	112	84	5	13	10	252	252	288	240	18	30
1971	17,265	2,340	2,340	14,315	6,558	7,757	112	83	5	14	10	246	246	252	200	19	33
1972	18,664	2,605	2,605	15,445	6,935	8,510	84	56	3	18	7	288	288	242	188	19	35
1973	20,175	2,674	2,674	16,793	7,020	9,773	118	70	4	33	11	294	294	296	238	20	38
1974	21,397	2,641	2,641	17,900	7,032	10,868	133	71	6	42	14	363	363	360	297	21	42
1975	22,742	2,890	2,890	18,887	7,318	11,569	148	78	7	47	16	414	414	403	330	22	51
1976	24,995	2,890	2,890	21,066	8,176	12,890	164	87	9	52	16	461	461	414	330	23	61
1977	27,677	3,147	3,147	23,361	8,980	14,381	200	112	14	58	16	517	517	452	352	27	73
1978	31,063	3,699	3,699	26,030	9,529	16,501	236	122	16	78	21	601	601	497	380	30	87
1979	35,379	4,082	4,082	29,772	10,672	19,100	284	160	16	85	23	637	637	604	470	36	98
1980 (prelim.)	40,211	4,263	4,263	34,194	11,849	22,345	343	208	20	90	25	761	761	650	495	45	110
1981 (est.)	45,770	5,125	5,125	38,800	13,525	25,275	375	225	25	100	25	800	800	670	500	55	115
1982 (est.)	51,400	5,800	5,800	43,750	15,350	28,400	405	250	25	105	25	775	775	670	485	65	120

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[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

Table 5. Sources of funds for research and development by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,124	2,753	2,245	72	54
1960[1]	13,523	8,738	4,516	149	120
1965[2]	20,044	13,012	6,548	267	217
1966	21,846	13,968	7,328	304	248
1967	23,146	14,395	8,142	345	264
1968	24,605	14,928	9,005	390	282
1969	25,631	14,895	10,010	420	306
1970	26,134	14,892	10,444	461	337
1971	26,676	14,964	10,822	529	361
1972	28,477	15,808	11,710	574	385
1973	30,718	16,399	13,293	613	413
1974	32,864	16,850	14,878	677	459
1975	35,213	18,109	15,820	749	535
1976	39,016	19,914	17,694	808	600
1977	42,982	21,727	19,696	887	672
1978	48,295	24,003	22,491	1,035	766
1979	54,994	26,935	26,028	1,194	837
1980 (prelim.)	62,222	29,576	30,400	1,313	933
1981 (est.)...	69,790	32,910	34,385	1,490	1,005
1982 (est.)...	77,285	36,125	38,500	1,600	1,060

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	8,677	4,649	3,816	121	91
1960[1]	19,635	12,673	6,573	214	175
1965[3]	26,896	17,443	8,806	356	291
1966	28,442	18,180	9,547	395	320
1967	29,241	18,176	10,299	434	332
1968	29,833	18,108	10,910	474	341
1969	29,586	17,209	11,536	488	353
1970	28,613	16,316	11,421	506	370
1971	27,814	15,615	11,271	553	375
1972	28,477	15,808	11,710	574	385
1973	29,163	15,602	12,579	588	394
1974	28,800	14,843	12,947	605	405
1975	28,204	14,561	12,603	608	432
1976	29,559	15,098	13,393	613	455
1977	30,695	15,500	14,085	631	479
1978	32,192	16,002	14,989	690	511
1979	33,782	16,545	15,990	733	514
1980 (prelim.)	35,114	16,705	17,139	743	527
1981 (est.)...	36,052	17,004	17,760	770	518
1981 (est.)...	36,974	17,276	18,428	764	506

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-311).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 6. Research and development performance by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,124	1,010	3,630	255	121	108
1960[1]	13,523	1,726	10,509	646	360	282
1965[2]	20,044	3,093	14,185	1,474	629	663
1966	21,846	3,220	15,548	1,715	630	733
1967	23,146	3,396	16,385	1,921	673	771
1968	24,605	3,494	17,429	2,149	719	814
1969	25,631	3,503	18,308	2,225	725	870
1970	26,134	4,079	18,067	2,335	737	916
1971	26,676	4,228	18,320	2,500	716	912
1972	28,477	4,590	19,552	2,630	753	952
1973	30,718	4,762	21,249	2,884	817	1,006
1974	32,864	4,911	22,887	3,023	865	1,178
1975	35,213	5,354	24,187	3,409	987	1,276
1976	39,016	5,769	26,997	3,727	1,147	1,376
1977	42,982	6,105	29,928	4,070	1,384	1,495
1978	48,295	6,920	33,365	4,621	1,717	1,672
1979	54,994	7,564	38,147	5,354	1,935	1,994
1980 (prelim.)	62,222	7,929	44,879	6,049	2,235	2,130
1981 (est.) ..	69,790	9,000	49,600	6,600	2,350	2,240
1982 (est.) ..	77,285	10,000	55,700	6,950	2,350	2,285

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	8,677	1,692	6,161	428	203	183
1960[1]	19,635	2,481	15,297	928	517	412
1965[3]	26,896	4,124	19,077	1,965	838	892
1966	28,442	4,183	20,256	2,229	819	955
1967	29,241	4,276	20,725	2,417	840	975
1968	29,833	4,246	21,116	2,612	874	985
1969	29,586	4,065	21,094	2,582	842	1,003
1970	28,613	4,481	19,756	2,564	809	1,003
1971	27,814	4,422	19,081	2,613	749	949
1972	28,477	4,590	19,552	2,630	753	952
1973	29,163	4,561	20,106	2,763	782	951
1974	28,800	4,387	19,915	2,700	773	1,025
1975	28,204	4,350	19,263	2,771	802	1,018
1976	29,559	4,381	20,435	2,831	871	1,041
1977	30,695	4,343	21,403	2,895	985	1,069
1978	32,192	4,615	22,237	3,081	1,145	1,114
1979	33,782	4,646	23,435	3,287	1,188	1,226
1980 (prelim.)	35,114	4,486	24,740	3,423	1,265	1,200
1981 (est.) ..	36,052	4,652	25,619	3,411	1,215	1,155
1982 (est.) ..	36,974	4,778	26,663	3,319	1,122	1,092

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 7. Sources of funds for basic research by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	441	251	153	10	27
1960[1]	1,197	715	342	72	68
1965[2]	2,555	1,809	461	164	121
1966	2,814	1,978	510	197	129
1967	3,056	2,201	492	223	140
1968	3,296	2,336	535	276	149
1969	3,441	2,441	540	298	162
1970	3,549	2,489	528	350	182
1971	3,672	2,529	547	400	196
1972	3,829	2,633	563	415	218
1973	3,955	2,718	605	408	224
1974	4,248	2,921	651	432	244
1975	4,619	3,150	705	478	286
1976	4,987	3,447	769	474	297
1977	5,550	3,836	850	526	338
1978	6,399	4,454	964	603	378
1979	7,260	5,054	1,008	707	411
1980 (prelim.)	8,071	5,547	1,265	799	460
1981 (est.)	8,805	5,980	1,430	900	495
1982 (est.)	9,330	6,220	1,615	975	520

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	742	421	259	17	45
1960[1]	1,729	1,030	497	103	99
1965[2]	3,416	2,415	620	219	162
1966	3,660	2,571	665	256	168
1967	3,853	2,774	622	281	176
1968	4,001	2,837	649	335	180
1969	3,985	2,829	623	346	187
1970	3,895	2,733	578	384	200
1971	3,836	2,644	570	418	204
1972	3,829	2,633	563	415	218
1973	3,775	2,598	573	391	213
1974	3,769	2,601	567	386	215
1975	3,735	2,553	563	388	231
1976	3,784	2,617	582	360	225
1977	3,952	2,730	607	374	241
1978	4,266	2,970	642	402	252
1979	4,460	3,105	668	434	253
1980 (prelim.)	4,562	3,137	713	452	260
1981 (est.)	4,549	3,090	739	465	255
1982 (est.)	4,459	2,973	772	466	248

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 8. Basic research performance by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	441	101	151	110	33	46
1960[1]	1,197	160	376	433	97	131
1965[2]	2,555	364	592	1,138	208	253
1966	2,814	385	624	1,303	227	275
1967	3,056	435	629	1,457	250	285
1968	3,296	432	642	1,649	276	297
1969	3,441	532	618	1,711	275	305
1970	3,549	577	602	1,796	269	305
1971	3,672	586	590	1,914	260	322
1972	3,829	625	593	2,022	244	345
1973	3,955	617	631	2,053	297	357
1974	4,248	705	699	2,154	285	405
1975	4,619	745	730	2,410	309	425
1976	4,987	797	819	2,548	359	464
1977	5,550	925	911	2,802	402	510
1978	6,399	1,040	1,035	3,172	567	585
1979	7,260	1,100	1,155	3,607	718	680
1980 (prelim.)	8,071	1,193	1,325	4,019	774	760
1981 (est.)	8,805	1,300	1,475	4,385	825	820
1982 (est.)	9,330	1,425	1,650	4,560	850	845

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	742	169	256	184	55	78
1960[1]	1,729	230	547	622	139	191
1965[2]	3,416	485	796	1,518	277	340
1966	3,660	500	813	1,693	295	359
1967	3,853	548	796	1,834	315	360
1968	4,001	525	778	2,003	335	360
1969	3,985	617	712	1,985	319	352
1970	3,895	634	659	1,973	295	334
1971	3,836	613	615	2,001	272	335
1972	3,829	625	593	2,022	244	345
1973	3,775	591	597	1,966	284	337
1974	3,769	630	608	1,924	255	352
1975	3,735	605	581	1,959	251	339
1976	3,784	605	620	1,935	273	351
1977	3,952	658	651	1,993	286	364
1978	4,266	694	690	2,115	378	389
1979	4,460	676	710	2,215	441	418
1980 (prelim.)	4,562	675	747	2,274	438	428
1981 (est.)	4,549	672	762	2,266	426	423
1982 (est.)	4,459	681	790	2,178	406	404

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 9. Sources of funds for applied research by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	1,279	747	455	57	20
1960[1]	3,020	1,688	1,226	66	40
1965[2]	4,339	2,524	1,654	88	73
1966	4,601	2,582	1,841	89	89
1967	4,780	2,694	1,889	102	95
1968	5,131	2,810	2,125	97	99
1969	5,316	2,785	2,320	105	106
1970	5,720	3,080	2,427	98	115
1971	5,739	3,008	2,494	115	122
1972	5,984	3,104	2,615	140	125
1973	6,588	3,385	2,891	172	140
1974	7,219	3,525	3,332	203	159
1975	7,852	3,929	3,517	224	182
1976	9,034	4,523	4,003	282	226
1977	9,755	4,783	4,424	303	245
1978	10,833	5,218	4,981	354	280
1979	12,355	5,860	5,789	402	304
1980 (prelim.)	13,940	6,453	6,725	424	338
1981 (est.)...	15,215	6,755	7,600	490	370
1982 (est.)...	16,555	7,245	8,395	520	395

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	2,164	1,260	774	96	34
1960[1]	4,380	2,442	1,785	95	58
1965[2]	5,818	3,379	2,224	117	98
1966	5,989	3,359	2,398	116	116
1967	6,036	3,398	2,390	128	120
1968	6,223	3,411	2,574	118	120
1969	6,139	3,221	2,674	122	122
1970	6,265	3,377	2,654	108	126
1971	5,985	3,141	2,597	120	127
1972	5,984	3,104	2,615	140	125
1973	6,262	3,227	2,736	165	134
1974	6,340	3,119	2,900	181	140
1975	6,301	3,170	2,802	182	147
1976	6,847	3,431	3,030	214	172
1977	6,964	3,409	3,164	216	175
1978	7,222	3,479	3,320	236	187
1979	7,588	3,599	3,556	247	186
1980 (prelim.)	7,869	3,647	3,791	240	191
1981 (est.)...	7,860	3,491	3,925	253	191
1982 (est.)...	7,918	3,463	4,081	248	189

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 10. Applied research performance by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	1,279	345	726	130	44	34
1960[1]	3,020	595	2,029	179	122	95
1965[2]	4,339	990	2,658	279	204	208
1966	4,601	997	2,843	328	207	226
1967	4,780	1,027	2,915	374	219	245
1968	5,131	1,110	3,124	404	231	262
1969	5,316	1,114	3,287	407	210	298
1970	5,720	1,327	3,427	427	216	323
1971	5,739	1,302	3,415	474	210	338
1972	5,984	1,360	3,514	524	221	365
1973	6,588	1,471	3,825	713	226	353
1974	7,219	1,565	4,288	736	217	413
1975	7,852	1,719	4,570	851	264	448
1976	9,034	2,082	5,112	1,015	327	498
1977	9,755	2,033	5,656	1,068	465	533
1978	10,833	2,181	6,300	1,213	549	590
1979	12,355	2,382	7,220	1,463	580	710
1980 (prelim.)	13,940	2,473	8,360	1,687	700	720
1981 (est.)...	15,215	2,575	9,325	1,840	725	750
1982 (est.)...	16,555	2,775	10,300	1,985	725	770

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	2,160	578	1,235	219	74	58
1960[1]	4,380	855	2,954	257	175	139
1965[2]	5,818	1,320	3,575	371	272	280
1966	5,989	1,295	3,704	427	269	294
1967	6,036	1,293	3,687	470	276	310
1968	6,223	1,349	3,785	491	281	317
1969	6,139	1,293	3,787	472	244	343
1970	6,265	1,458	3,747	469	237	354
1971	5,985	1,362	3,556	495	220	352
1972	5,984	1,360	3,514	524	221	365
1973	6,262	1,409	3,620	683	216	334
1974	6,340	1,398	3,731	657	194	380
1975	6,301	1,397	3,640	692	215	357
1976	6,847	1,581	3,869	772	248	377
1977	6,964	1,446	4,045	760	331	382
1978	7,222	1,454	4,199	809	366	394
1979	7,588	1,463	4,435	898	356	436
1980 (prelim.)	7,869	1,399	4,713	955	396	406
1981 (est.)...	7,860	1,331	4,816	951	375	387
1982 (est.)...	7,918	1,326	4,930	948	346	368

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 11. Sources of funds used for development by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	3,404	1,755	1,637	5	7
1960[1]	9,306	6,335	2,948	11	12
1965[2]	13,150	8,679	4,433	15	23
1966	14,431	9,408	4,977	18	28
1967	15,310	9,500	5,761	20	29
1968	16,178	9,782	6,345	17	34
1969	16,874	9,669	7,150	17	38
1970	16,865	9,323	7,489	13	40
1971	17,265	9,427	7,781	14	43
1972	18,664	10,071	8,532	19	42
1973	20,175	10,296	9,797	33	49
1974	21,397	10,404	10,895	42	56
1975	22,742	11,030	11,598	47	67
1976	24,995	11,944	12,922	52	77
1977	27,677	13,108	14,422	58	89
1978	31,063	14,331	16,546	78	108
1979	35,379	16,021	19,151	85	122
1980 (prelim.)	40,211	17,576	22,410	90	135
1981 (est.)...	45,770	20,175	25,355	100	140
1982 (est.)...	51,400	22,660	28,490	105	145

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,771	2,968	2,783	8	12
1960[1]	13,526	9,201	4,291	16	18
1965[2]	17,662	11,649	5,962	20	31
1966	18,793	12,250	6,484	23	36
1967	19,352	12,004	7,287	25	36
1968	19,609	11,860	7,687	21	41
1969	19,462	11,159	8,239	20	44
1970	18,453	10,206	8,189	14	44
1971	17,993	9,830	8,104	15	44
1972	18,664	10,071	8,532	19	42
1973	19,126	9,777	9,270	32	47
1974	18,691	9,123	9,480	38	50
1975	18,168	8,838	9,238	38	54
1976	18,928	9,050	9,781	39	58
1977	19,779	9,361	10,314	41	63
1978	20,704	9,553	11,027	52	72
1979	21,734	9,841	11,766	52	75
1980 (prelim.)	22,683	9,921	12,635	51	76
1981 (est.)...	23,643	10,423	13,096	52	72
1982 (est.)...	24,597	10,840	13,638	50	69

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 12. Development performance by sector: 1953, 1960, and 1965-82

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	3,404	564	2,753	15	44	28
1960[1]	9,306	971	8,104	34	141	56
1965[2]	13,150	1,739	10,935	57	217	202
1966	14,431	1,838	12,081	84	196	232
1967	15,310	1,934	12,841	90	204	241
1968	16,178	1,952	13,663	96	212	255
1969	16,874	1,857	14,403	107	240	267
1970	16,865	2,175	14,036	112	252	288
1971	17,265	2,340	14,315	112	246	252
1972	18,664	2,605	15,445	84	288	242
1973	20,175	2,674	16,793	118	294	296
1974	21,397	2,641	17,900	133	363	360
1975	22,742	2,890	18,887	148	414	403
1976	24,995	2,890	21,066	164	461	414
1977	27,677	3,147	23,361	200	517	452
1978	31,063	3,699	26,030	236	601	497
1979	35,379	4,082	29,772	284	637	604
1980 (prelim.)	40,211	4,263	34,194	343	761	650
1981 (est.)...	45,770	5,125	38,800	375	800	670
1982 (est.)...	51,400	5,800	43,750	405	775	670

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,771	945	4,680	25	74	47
1960[1]	13,526	1,396	11,796	49	203	82
1965[2]	17,662	2,319	14,706	76	289	272
1966	18,793	2,388	15,739	109	255	302
1967	19,352	2,435	16,242	113	257	305
1968	19,609	2,372	16,553	118	258	308
1969	19,462	2,155	16,595	125	279	308
1970	18,453	2,389	15,350	122	277	315
1971	17,993	2,447	14,910	117	257	262
1972	18,664	2,605	15,445	84	288	242
1973	19,126	2,561	15,889	114	282	280
1974	18,691	2,359	15,576	119	324	313
1975	18,168	2,348	15,042	120	336	322
1976	18,928	2,195	15,946	124	350	313
1977	19,779	2,239	16,707	142	368	323
1978	20,704	2,467	17,348	157	401	331
1979	21,734	2,507	18,290	174	391	372
1980 (prelim.)	22,683	2,412	19,280	194	431	366
1981 (est.)...	23,643	2,649	20,441	194	414	345
1982 (est.)...	24,597	2,771	20,943	193	370	320

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 13. Trends in Federal and non-Federal R&D outlays: 1953 and 1960-82

[Percents]

Year	Federal				Non-Federal
	Total	Defense related	Space related	Civilian related	
1953	54	48	1	5	46
1960	65	52	3	9	35
1961	65	50	6	9	35
1962	64	48	7	9	36
1963	66	41	14	11	34
1964	66	37	19	9	34
1965	65	33	21	11	35
1966	64	33	19	12	36
1967	62	35	14	13	38
1968	61	35	13	13	39
1969	58	34	11	13	42
1970	57	33	10	14	43
1971	56	32	9	15	44
1972	56	33	8	15	44
1973	53	31	7	15	47
1974	51	28	7	16	49
1975	51	27	7	17	49
1976	51	26	8	17	49
1977	51	26	7	18	49
1978	50	24	7	19	50
1979	49	23	7	19	51
1980 (prelim.)	48	23	7	18	52
1981 (est.)	47	24	7	16	53
1982 (est.)	47	25	7	15	53

Note: Detail may not add to 100 because of rounding.
SOURCE: National Science Foundation

Table 14. Full-time-equivalent (FTE) scientists and engineers employed in research and development by sector: selected years[1]

[In thousands]

Sector	1954	1961	1965	1969	1972	1975	1977	1978	1979	1980[1]	1981[2]	1982[2]
Total	237.1	425.7	494.5	555.2	518.3	532.7	570.3	595.3	621.0	647.2	673.0	698.0
Federal Government[3]	37.7	51.1	61.8	68.5	64.4	63.4	64.7	66.3	66.7	67.0	67.0	68.0
Industry [4,5]	164.1	312.0	348.4	385.6	353.9	363.8	393.2	413.4	434.9	458.4	482.0	505.0
Universities and colleges, total	25.0	42.4	53.4	68.3	66.5	69.8	74.4	76.5	77.8	79.1	81.1	83.0
Scientists and engineers	20.3	33.6	40.4	50.4	48.9	51.2	54.4	55.9	56.1	56.4	57.2	58.1
Graduate students[6]	4.7	8.8	13.0	17.9	17.6	18.6	20.0	20.6	21.7	22.7	23.9	24.9
University-associated FFRDC's, total	5.0	9.1	11.1	11.6	11.7	12.7	14.0	14.1	14.1	15.2	15.4	15.9
Scientists and engineers	4.9	8.8	10.7	11.1	11.3	12.3	13.6	13.7	13.7	14.8	15.0	15.5
Graduate students[6]	.1	.3	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4
Other nonprofit institutions[4]	5.3	11.1	19.9	21.2	21.8	23.0	24.0	25.0	27.5	27.5	27.5	26.1

[1] Number of full-time employees plus the FTE of part-time employees. Excludes scientists and engineers employed in State and local government agencies. Totals may be understated by about 5 percent because of incomplete data on summer employment at universities and colleges.

[2] Estimate.

[3] Includes both civilian and military service personnel and managers of R&D.

[4] Includes professional R&D personnel employed at FFRDC's administered by organizations in the sector.

[5] Excludes social scientists.

[6] Numbers of FTE graduate students receiving stipends and engaged in R&D.

NOTE: The figures for the industry sector represent yearly averages and may differ from other data in the text which is based upon surveys reporting the employment in a single month of the year.

SOURCE: National Science Foundation

Table 15. National expenditures for performance of R&D as a percent of gross national product (GNP) by source: 1961-82

Year	Total	Federal	Non-Federal
1961	2.73	1.76	.97
1962	2.72	1.75	.97
1963	2.86	1.88	.98
1964	2.96	1.97	.99
1965	2.90	1.88	1.02
1966	2.89	1.85	1.04
1967	2.89	1.80	1.09
1968	2.82	1.71	1.11
1969	2.72	1.58	1.14
1970	2.63	1.50	1.13
1971	2.48	1.39	1.09
1972	2.40	1.33	1.07
1973	2.32	1.24	1.08
1974	2.29	1.17	1.12
1975	2.27	1.17	1.10
1976	2.27	1.16	1.11
1977	2.24	1.13	1.11
1978	2.24	1.11	1.13
1979	2.28	1.12	1.16
1980 (prelim.)	2.37	1.13	1.24
1981 (est.)	2.39	1.13	1.26
1982 (est.)	2.45	1.14	1.31

SOURCES: National Science Foundation and Department of Commerce

Table 16. R&D scientists and engineers and employed civilian labor force: selected years

[In thousands]

Year	R&D scientists and engineers	Employed civilian labor force
1967	530.0	74,372
1969	555.2	77,902
1971	527.1	79,120
1973	518.4	84,409
1975	532.7	84,783
1977	570.3	90,546
1979	621.0	96,945
1981 (est)	673.0	98,500

SOURCES: National Science Foundation and Department of Labor

Table 17. National expenditures for performance of R&D as a percent of gross national product (GNP) by country: 1967-81

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.
1967	2.13	1.97	1.52	2.29	2.89	2.91
1968	2.08	1.97	1.60	2.25	2.82	NA
1969	1.94	2.05	1.64	2.22	2.72	3.03
1970	1.91	2.18	1.81	NA	2.63	3.23
1971	1.90	2.38	1.85	NA	2.48	3.29
1972	1.86	2.33	1.86	2.05	2.40	3.58
1973	1.76	2.22	1.90	NA	2.32	3.66
1974	1.79	2.26	1.97	NA	2.29	3.64
1975	1.80	2.38	1.96	2.05	2.27	3.69
1976	1.77	2.29	1.95	NA	2.27	3.55
1977	1.76	2.31	1.93	NA	2.24	3.46
1978	1.76	2.31	1.96	2.13	2.24	3.47
1979	1.81	2.34	1.97	NA	2.28	3.44
1980	1.84	2.32	NA	NA	2.37	3.47
1981	NA	NA	NA	NA	2.39	NA

NA = Not available.

SOURCES: National Science Foundation, Organization for Economic Cooperation and Development, and Dr. Robert Campbell (Indiana University)

Table 18. Scientists and engineers[1] engaged in R&D per 10,000 labor force population by country: 1967-81

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.	
						Low estimate	High estimate
1967	25.3	24.9	27.8	NA	66.1	50.7	55.3
1968	26.4	26.2	31.1	20.8	66.9	53.5	58.8
1969	27.2	28.4	30.8	NA	65.9	56.5	62.1
1970	27.3	30.9	33.4	NA	63.6	58.4	64.2
1971	27.8	33.8	37.5	NA	60.4	63.0	69.1
1972	28.1	36.0	38.1	30.4	57.9	66.5	73.2
1973	28.4	37.8	42.5	NA	56.5	73.5	81.5
1974	28.8	39.1	44.9	NA	55.8	74.5	82.9
1975	29.3	41.0	47.9	31.3	55.6	78.2	87.5
1976	29.9	41.7	48.4	NA	55.6	80.7	90.9
1977	30.0	44.3	49.9	NA	56.4	81.3	91.5
1978	31.0	NA	49.4	33.2	56.9	82.9	93.3
1979	31.6	NA	NA	NA	57.9	84.2	94.9
1980	NA	NA	NA	NA	59.0	NA	NA
1981	NA	NA	NA	NA	60.5	NA	NA

[1] Includes all scientists and engineers engaged in R&D on a full-time-equivalent basis (except Japan whose data include persons primarily employed in R&D and the United Kingdom whose data include only the government and industry sectors).

NA = Not available.

SOURCES: National Science Foundation, U.S. Department of Labor, Organization for Economic Cooperation and Development, and Dr. Robert Capbell (Indiana University)

Table 19. Estimated ratio of civilian R&D expenditures[1] to gross national product (GNP) for selected countries: 1967-81

Year	France	West Germany	Japan	United Kingdom	United States
1967	1.50	1.70	1.49	1.65	1.48
1968	1.54	1.72	1.57	1.66	1.46
1969	1.52	1.81	1.61	1.66	1.49
1970	1.47	1.96	1.77	NA	1.50
1971	1.33	2.16	1.82	NA	1.46
1972	1.35	2.13	1.82	1.48	1.44
1973	1.30	2.01	1.86	NA	1.43
1974	1.36	2.07	1.91	NA	1.49
1975	1.39	2.19	1.90	1.38	1.50
1976	1.38	2.10	1.89	NA	1.50
1977	1.38	2.13	1.87	NA	1.50
1978	1.36	2.13	1.90	1.49	1.55
1979	1.38	2.16	NA	NA	1.59
1980	1.35	2.15	NA	NA	1.66
1981	NA	NA	NA	NA	1.65

[1] National R&D expenditures, excluding government funds for defense and space.

NA = Not available.

SOURCES: National Science Foundation and Organization for Economic Cooperation and Development

TABLE 20. FEDERAL OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL AGENCIES ..	17,488,803	18,297,104	19,550,839	21,020,862	23,379,120	25,678,894	27,842,218	31,881,731	35,276,568	39,762,269
DEPT OF AGRIC, TOTAL .	357,068	381,452	425,641	468,843	537,766	572,359	630,474	687,556	799,385	875,932
FOREST SERVICE	58,286	65,617	72,488	90,277	92,533	86,708	105,700	100,561	113,400	135,500
SCI & ED ADMIN 1/...	281,770	295,878	328,436	351,656	414,738	453,251	487,751	545,821	638,143	689,754
AGRIC RESEARCH ...	199,349	210,547	232,781	247,441	294,580	318,401	331,158	371,576	436,951	461,153
AGRIC COOPERATIVE RESEARCH	82,147	85,162	95,579	104,196	120,158	134,850	156,593	174,245	201,192	228,601
TECH INFORMATION SYSTEMS	274	169	76	19	-	-	-	-	-	-
OTHER AGRICULTURE ..	17,012	19,957	24,717	26,910	30,495	32,400	37,023	41,174	47,842	50,678
DEPT OF COMMERCE, TOTAL	186,193	188,202	224,592	233,316	238,188	272,678	307,094	360,640	360,242	332,231
NATIONAL BUREAU OF STANDARDS	36,846	42,464	47,165	49,107	53,128	59,002	64,758	77,129	83,370	99,050
NATIONAL OCEANIC & ATMOS ADMIN	114,420	109,488	127,689	134,457	132,609	164,733	190,110	210,583	215,034	195,284
OTHER COMMERCE	34,927	36,250	49,738	49,752	52,451	48,943	52,226	72,928	61,838	37,897
DEPT OF DEFENSE, TOTAL	8,597,649	8,979,742	9,363,517	9,445,510	10,307,977	10,935,419	11,733,102	13,706,133	15,845,283	19,878,651
ARMY	2,042,439	2,308,602	2,083,044	1,969,575	2,195,044	2,464,318	2,536,219	2,852,886	3,145,143	3,722,338
NAVY	2,498,936	2,715,822	3,126,263	3,320,098	3,582,569	3,919,368	3,926,432	4,507,858	5,082,666	5,639,110
AIR FORCE	3,588,512	3,442,302	3,567,555	3,625,220	3,902,173	3,969,911	4,427,950	5,323,563	6,393,474	8,872,203
DEFENSE AGENCIES ...	461,310	485,162	556,858	507,500	610,460	555,057	814,181	981,435	1,185,000	1,601,000
OTHER DEFENSE	6,452	27,854	29,797	23,117	17,731	26,765	28,320	40,391	39,000	44,000
DEPT OF EDUCATION 2/..	138,014	163,218	136,371	128,067	91,609	101,781	136,476	120,910	134,245	101,605
DEPT OF ENERGY 3/.....	1,624,370	1,824,987	2,246,625	2,553,700	3,593,121	4,413,005	4,956,800	5,660,248	6,104,503	5,815,082
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 4/	1,740,371	1,797,358	2,031,830	2,486,963	2,530,614	2,968,454	3,172,700	3,554,091	3,717,360	3,947,045
NAT'L INST OF HEALTH	1,373,688	1,435,422	1,684,363	2,118,384	2,104,983	2,507,105	2,713,447	3,029,267	3,178,697	3,431,369
OTHER HHS	366,683	361,936	347,467	368,579	425,631	461,349	459,253	524,824	538,663	515,676
DEPT OF HOUSING & URBAN DEV	47,763	58,382	58,737	60,274	68,981	59,269	74,324	65,785	58,142	46,389
DEPT OF THE INTERIOR, TOTAL	254,143	194,817	265,994	319,748	303,953	339,932	404,277	431,486	432,381	394,907
BUREAU OF MINES	68,553	66,705	82,681	113,700	103,675	104,180	121,378	130,802	127,403	106,806
GEOLOGICAL SURVEY ..	62,741	68,671	95,176	115,664	112,205	128,711	144,157	145,168	153,753	171,190
OTHER INTERIOR	122,849	59,441	88,137	90,384	88,073	107,041	138,742	155,516	151,225	116,911
DEPT OF JUSTICE	22,177	40,490	43,809	39,918	33,709	33,457	45,878	45,320	41,698	33,953
DEPT OF LABOR	18,334	22,477	25,358	27,814	28,062	97,629	109,170	137,733	107,186	36,832
DEPT OF STATE	1,489	1,551	1,237	1,611	2,280	2,848	3,168	2,206	1,887	1,827
DEPT OF TRANS, TOTAL .	337,287	363,738	339,191	335,700	363,504	377,250	372,362	390,969	393,750	380,450
FEDL AVIATION ADMIN	88,627	115,846	113,681	114,600	102,800	100,200	111,400	109,700	129,200	114,600
OTHER TRANSPORTATION	248,660	247,892	225,510	221,100	260,704	277,050	260,962	281,269	264,550	265,850
DEPT OF THE TREASURY .	1,013	1,139	1,689	3,842	5,015	9,901	9,581	10,900	13,050	14,050
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	147,668	172,242	218,567	265,620	282,950	312,514	388,867	384,700	343,700	327,200
NATIONAL AERONAUTICS & SPACE ADMIN	3,315,163	3,256,216	3,266,491	3,669,022	3,945,311	3,983,119	4,196,472	4,851,637	5,274,000	5,895,200
NAT'L SCI FOUNDATION .	470,541	584,711	600,400	669,100	674,700	738,566	804,561	848,200	909,100	920,100
NUCLEAR REGULATORY COMMISSION	-	46,148	58,458	76,879	107,823	131,690	145,422	182,752	207,504	222,662
VETERANS ADMIN	82,793	85,715	97,026	109,504	112,822	123,931	123,128	138,608	146,881	158,349
ALL OTHER	146,367	134,519	145,306	125,431	150,735	205,092	228,362	301,857	386,271	379,804

1/ THE SCIENCE AND EDUCATION ADMINISTRATION WAS ESTABLISHED IN FY 1977.

2/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

3/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

4/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 21. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL AGENCIES ..	16,800,153	17,410,128	19,038,818	20,779,658	23,982,973	26,387,291	28,977,746	31,680,398	35,360,469	40,601,999
DEPT OF AGRIC, TOTAL .	366,522	378,706	420,082	462,449	546,963	621,282	663,025	687,586	770,295	860,039
FOREST SERVICE	58,442	65,496	78,181	79,901	90,262	105,617	107,500	111,531	122,200	134,300
SCI & ED ADMIN 1/...	289,220	293,108	318,271	355,508	426,211	482,965	518,393	536,016	600,929	675,058
AGRIC RESEARCH ...	199,539	203,544	217,124	242,111	298,946	325,541	345,836	351,811	400,032	440,870
AGRIC COOPERATIVE RESEARCH	89,406	89,421	101,141	113,389	127,265	157,424	172,557	184,205	200,897	234,188
TECH INFORMATION SYSTEMS	275	143	6	8	-	-	-	-	-	-
OTHER AGRICULTURE ..	18,860	20,102	23,630	27,040	30,490	32,700	37,132	40,039	47,166	50,681
DEPT OF COMMERCE, TOTAL	190,600	180,585	215,382	228,853	244,721	283,665	309,359	342,549	336,809	287,990
NATIONAL BUREAU OF STANDARDS	36,840	40,210	43,156	47,444	53,223	58,306	67,800	76,167	82,983	93,487
NATIONAL OCEANIC & ATMOS ADMIN	115,614	109,090	128,017	135,094	145,692	161,450	171,176	199,750	197,847	165,421
OTHER COMMERCE	38,146	31,285	44,209	46,315	45,806	63,909	70,383	66,632	55,979	29,082
DEPT OF DEFENSE, TOTAL	8,404,214	8,420,386	9,012,472	9,654,722	10,963,351	11,553,638	12,506,225	13,981,012	16,864,091	21,523,190
ARMY	2,013,569	2,009,862	1,896,742	2,013,653	2,441,866	2,548,927	2,768,674	2,979,987	3,290,952	4,020,292
NAVY	2,654,754	2,718,520	3,100,165	3,328,005	3,817,410	3,998,416	4,335,042	4,706,132	5,061,780	6,057,586
AIR FORCE	3,273,543	3,216,215	3,513,495	3,726,627	4,031,095	4,262,349	4,525,616	5,211,029	7,195,957	9,542,442
DEFENSE AGENCIES ...	434,081	448,881	476,537	561,647	641,441	707,886	847,583	1,045,984	1,278,433	1,853,839
OTHER DEFENSE	28,267	26,908	25,533	24,790	31,539	36,060	29,310	37,880	36,969	49,031
DEPT OF EDUCATION 2/..	165,120	127,218	116,277	122,962	97,006	123,772	166,288	139,372	137,247	95,900
DEPT OF ENERGY 3/.....	1,363,196	1,488,903	2,047,306	2,463,809	3,536,220	4,244,827	4,638,766	4,753,688	4,926,728	4,690,233
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 4/	1,672,458	2,162,896	2,281,181	2,460,601	2,726,291	3,083,482	3,504,880	3,780,221	3,904,765	4,168,588
NAT'L INST OF HEALTH	1,314,198	1,736,784	1,879,872	2,060,247	2,279,859	2,580,862	2,953,133	3,181,830	3,328,345	3,570,821
OTHER HHS	358,260	426,112	401,309	400,354	446,432	502,620	551,747	598,391	576,420	597,767
DEPT OF HOUSING & URBAN DEV	57,829	64,777	62,028	67,575	52,104	69,723	67,915	56,025	51,317	51,389
DEPT OF THE INTERIOR, TOTAL	243,746	192,427	303,329	333,198	314,682	358,974	405,778	411,258	422,933	397,789
BUREAU OF MINES	77,507	66,107	107,627	131,300	101,914	113,968	121,004	113,373	110,685	107,661
GEOLOGICAL SURVEY ..	66,596	66,234	106,616	110,324	117,468	133,656	145,571	146,339	164,266	175,399
OTHER INTERIOR	99,643	60,086	89,086	91,574	95,300	111,350	139,203	151,546	147,982	114,729
DEPT OF JUSTICE	33,199	34,684	44,330	33,859	27,650	60,919	42,991	41,501	34,182	26,155
DEPT OF LABOR	19,943	23,775	25,376	28,533	29,565	97,835	136,977	138,053	107,559	37,092
DEPT OF STATE	1,489	1,463	1,237	1,611	2,280	2,848	3,168	2,206	1,887	1,827
DEPT OF TRANS. TOTAL .	310,640	369,789	311,563	294,500	354,604	408,250	370,089	361,230	399,426	404,000
FEDL AVIATION ADMIN	79,455	125,013	105,578	98,100	103,400	110,500	110,500	103,100	120,100	120,900
OTHER TRANSPORTATION	231,185	244,776	205,985	196,400	251,204	297,750	259,589	258,130	279,326	283,100
DEPT OF THE TREASURY .	1,000	1,125	1,665	3,735	4,805	9,878	9,541	12,033	13,204	13,955
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	180,592	169,213	257,657	259,138	295,450	384,636	410,100	345,000	363,100	302,600
NATIONAL AERONAUTICS & SPACE ADMIN	3,060,887	3,002,172	3,064,413	3,446,830	3,703,385	3,875,414	4,411,008	5,084,054	5,407,688	6,017,400
NAT'L SCI FOUNDATION .	479,893	556,413	595,021	609,256	697,019	748,775	807,925	881,792	937,404	999,900
NUCLEAR REGULATORY COMMISSION	-	42,338	64,155	88,432	112,291	133,891	148,772	182,672	207,673	224,540
VETERANS ADMIN	74,271	84,805	94,807	97,679	107,001	113,991	127,004	133,400	145,900	152,900
ALL OTHER	174,554	108,453	120,537	121,916	167,585	211,491	247,935	346,746	328,261	346,512

1/ THE SCIENCE AND EDUCATION ADMINISTRATION HAS ESTABLISHED IN FY 1977.

2/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

3/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

4/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 22. Federal R&D funding by budget function:[1] fiscal years 1972-82

[Dollars in millions]

Function	Actual									Estimates	
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	16,496	16,800	17,411	19,039	20,780	23,984	26,517	29,040	31;623	35,543	40,795
National defense	8,902	9,002	9,016	9,679	10,430	11,864	12,899	13,791	14,946	18,442	23,261
Space research and technology	2,932	2,824	2,702	2,764	3,130	3,365	3,481	3,989	4,587	4,929	5,539
Health	1,547	1,585	2,069	2,170	2,351	2,629	2,968	3,401	3,694	3,825	4,043
Energy	574	630	759	2,363	1,649	2,562	3,134	3,461	3,603	3,515	3,016
General science	625	658	749	813	858	974	1,050	1,119	1,233	1,304	1,441
Natural resources and environment	479	554	516	624	683	753	904	1,010	999	1,038	976
Transportation	559	572	694	635	631	709	768	799	888	878	884
Agriculture	294	308	313	342	383	457	501	552	585	647	725
Education, training, employment, and social services	235	290	236	239	255	230	345	354	468	339	299
Community and regional development	66	78	82	93	109	101	92	127	119	121	92
International affairs	29	28	24	29	42	66	57	117	127	127	142
Veterans benefits and services	69	74	85	95	98	107	111	123	126	138	146
Commerce and housing credit	50	50	51	65	69	71	77	92	102	111	122
Income security	106	106	71	72	46	55	67	57	77	76	55
Administration of justice	23	33	35	44	35	30	44	47	45	28	31
General government	8	7	9	12	12	13	20	23	22	26	24

[1] Listed in descending order of 1982 budget authority. Data for 1972-77 are shown in obligations; data for 1978-82 are shown in budget authority. Data for 1981-82 are estimates as shown in the 1982 budget published in March 1981.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

TABLE 23. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT BY CHARACTER OF WORK: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

FISCAL YEAR	TOTAL R&D	RESEARCH		DEVELOPMENT
		BASIC	APPLIED	
1973	16,800,153	2,241,675	3,339,754	11,218,724
1974	17,410,128	2,398,189	3,777,051	11,234,888
1975	19,038,818	2,600,383	4,129,325	12,309,110
1976	20,779,658	2,778,727	4,840,605	13,160,326
1977	23,982,973	3,269,497	5,244,618	15,468,858
1978	26,387,291	3,710,659	5,896,099	16,780,533
1979	28,977,746	4,205,516	6,329,489	18,442,741
1980	31,680,398	4,688,153	6,909,225	20,083,020
1981 (ESTIMATED)	35,360,469	5,036,672	7,322,622	23,001,175
1982 (ESTIMATED)	40,601,999	5,550,973	7,982,850	27,068,176

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 24. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY PERFORMER: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

PERFORMER	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL	16,800,153	17,410,128	19,038,818	20,779,658	23,982,973	26,387,291	28,977,746	31,680,398	35,360,469	40,601,999
FEDERAL INTRAMURAL 1/	4,762,157	4,910,901	5,353,962	5,768,719	6,104,625	6,919,952	7,562,931	7,929,402	9,017,845	9,995,795
INDUSTRIAL FIRMS 2/	8,313,643	8,345,164	9,126,894	10,154,138	12,248,079	13,052,419	14,140,579	15,830,040	17,980,986	21,887,178
UNIVS & COLLEGES	1,916,604	2,213,957	2,411,432	2,551,801	2,908,860	3,377,609	3,894,106	4,276,932	4,515,982	4,777,718
FFRDC'S ADMIN BY UNIV & COL	725,310	789,136	935,076	1,061,115	1,326,809	1,325,629	1,510,999	1,591,573	1,725,571	1,882,671
NONPROFIT INSTS 2/	761,241	871,548	922,260	939,621	1,068,371	1,320,104	1,404,348	1,575,704	1,624,715	1,538,162
STATE & LOCAL GOV	256,841	214,369	227,618	231,165	238,044	268,410	310,121	265,542	261,833	222,452
FOREIGN	64,357	65,053	61,576	73,099	88,185	123,168	154,662	211,205	233,537	298,023

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 25. FEDERAL OBLIGATIONS FOR RESEARCH BY SELECTED AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES 1981	ESTIMATES 1982
TOTAL, ALL AGENCIES ..	5,581,429	6,175,240	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,359,294	13,533,823
DEPT OF AGRICULTURE ..	354,106	365,064	401,944	442,224	524,020	594,484	631,920	657,435	738,694	825,731
DEPT OF COMMERCE	130,155	129,189	144,420	155,713	176,129	192,775	219,458	254,433	257,383	228,686
DEPT OF DEFENSE, TOTAL	1,436,079	1,434,408	1,431,007	1,527,481	1,715,845	1,824,058	2,014,098	2,261,769	2,584,004	3,148,166
ARMY	377,081	366,495	336,372	362,395	397,993	409,810	448,610	479,255	513,815	639,540
NAVY	386,348	401,331	406,491	437,950	497,362	526,317	567,315	611,100	701,500	808,400
AIR FORCE	340,985	341,651	355,842	382,302	425,775	448,745	492,253	537,300	608,200	667,300
DEFENSE AGENCIES ...	328,474	322,239	330,634	344,134	393,415	431,686	505,920	634,114	760,489	1,032,926
OTHER DEFENSE	3,191	2,692	1,668	700	1,300	7,500	-	-	-	-
DEPT OF EDUCATION 1/..	22,766	15,981	9,884	33,263	40,049	49,243	93,392	87,575	87,312	53,113
DEPT OF ENERGY 2/.....	424,784	464,748	593,431	746,499	891,266	1,102,243	1,131,846	1,277,326	1,407,444	1,620,816
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	1,421,433	1,830,711	1,914,946	2,117,470	2,374,231	2,691,474	3,015,669	3,332,777	3,470,466	3,698,725
NAT'L INST OF HEALTH	1,132,050	1,489,640	1,604,217	1,767,692	1,968,658	2,232,596	2,530,111	2,787,470	2,934,290	3,154,050
OTHER HHS	289,383	341,071	310,729	349,778	405,573	458,878	485,558	545,307	536,176	544,675
DEPT OF HOUSING & URBAN DEV	18,376	33,790	33,495	36,945	32,720	30,535	23,770	19,601	19,054	20,412
DEPT OF THE INTERIOR .	160,161	143,498	234,053	259,458	255,942	283,492	339,468	354,446	364,351	352,843
DEPT OF STATE	750	1,051	743	1,121	2,065	2,478	2,694	1,956	1,727	1,827
DEPT OF TRANSPORTATION	77,236	61,781	53,844	31,100	51,760	66,500	66,983	82,445	91,641	91,590
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	74,287	96,294	141,711	155,395	205,252	252,670	259,000	245,100	259,900	215,200
NATIONAL AERONAUTICS & SPACE ADMIN	793,920	845,667	935,139	1,222,841	1,206,076	1,345,167	1,451,236	1,609,644	1,554,566	1,653,948
NAT'L SCI FOUNDATION .	463,953	520,256	570,015	595,776	688,300	743,502	800,025	873,687	933,404	999,900
NUCLEAR REGULATORY COMMISSION	-	42,338	64,155	88,432	112,291	133,891	148,772	182,672	207,673	224,540
VETERANS ADMIN	69,730	78,728	87,140	85,127	92,342	99,400	111,362	117,900	129,200	136,900
ALL OTHER	133,693	111,736	113,781	120,487	145,827	194,846	225,312	238,612	252,475	261,426

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 26. FEDERAL OBLIGATIONS FOR RESEARCH, BY PERFORMER: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

PERFORMER	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES 1981	ESTIMATES 1982
TOTAL	5,581,429	6,175,240	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,359,294	13,533,823
FEDERAL INTRAMURAL 1/.	2,088,473	2,270,187	2,463,780	2,879,166	2,957,666	3,220,762	3,481,232	3,666,272	3,881,764	4,194,891
INDUSTRIAL FIRMS 2/...	956,042	972,825	1,145,947	1,279,463	1,559,425	1,886,579	2,006,931	2,388,636	2,591,160	3,031,454
UNIVS & COLLEGES	1,691,055	1,958,267	2,078,766	2,249,735	2,583,507	2,928,039	3,333,375	3,699,071	3,941,198	4,180,189
FFRDC'S ADMIN BY UNIV & COL	355,166	373,966	425,512	548,278	670,304	714,850	800,601	851,155	932,136	1,095,230
NONPROFIT INSTS 2/....	366,417	464,926	459,492	492,932	567,715	657,777	695,995	750,165	753,681	774,265
STATE & LOCAL GOV	84,289	91,024	111,907	119,371	115,177	128,827	139,466	150,932	150,441	142,514
FOREIGN	39,987	44,045	44,304	50,387	60,321	69,924	77,405	91,147	108,914	115,280

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 27. FEDERAL OBLIGATIONS FOR RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES 1981	ESTIMATES 1982
TOTAL, ALL FIELDS	5,581,429	6,175,240	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,359,294	13,533,823
LIFE SCIENCES	1,931,101	2,265,140	2,455,195	2,649,696	3,007,749	3,427,133	3,848,281	4,192,335	4,435,942	4,714,349
PSYCHOLOGY	109,924	133,419	139,192	143,996	156,201	193,243	197,384	199,009	205,965	228,217
PHYSICAL SCIENCES	981,740	1,016,069	1,096,644	1,258,892	1,530,171	1,645,647	1,792,554	2,000,612	2,233,827	2,644,129
ENVIRONMENTAL SCIENCES	580,527	636,327	727,269	769,284	906,001	1,024,566	1,100,984	1,260,957	1,275,711	1,376,966
MATH & COMPUTER SCI ..	114,762	114,268	125,260	157,794	195,880	216,280	210,301	240,943	284,056	321,781
ENGINEERING	1,370,581	1,563,733	1,717,777	2,068,655	2,112,917	2,404,595	2,571,630	2,830,131	3,027,107	3,375,822
SOCIAL SCIENCES	298,790	292,196	301,816	392,456	426,125	489,486	527,310	523,811	517,328	485,227
OTHER SCIENCES, NEC ..	194,004	154,088	166,555	178,559	179,071	205,808	286,561	349,580	379,358	387,332

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 28. FEDERAL OBLIGATIONS FOR BASIC RESEARCH BY AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES 1981	ESTIMATES 1982
TOTAL, ALL AGENCIES ..	2,241,675	2,398,189	2,600,383	2,778,727	3,269,497	3,710,659	4,205,516	4,688,153	5,036,672	5,550,973
DEPT OF AGRICULTURE ..	142,726	145,611	154,184	171,371	204,450	242,704	256,420	275,650	319,260	362,893
DEPT OF COMMERCE	16,313	18,189	20,065	22,274	23,159	23,861	24,751	29,907	32,210	36,670
DEPT OF DEFENSE, TOTAL	306,711	302,943	300,065	326,885	373,254	410,410	471,527	540,341	612,925	721,990
ARMY	76,850	76,346	71,690	81,386	99,039	104,073	115,040	132,190	143,135	192,400
NAVY	112,690	114,194	118,702	129,673	153,769	172,088	192,122	214,900	240,400	282,000
AIR FORCE	79,927	77,503	78,941	83,926	84,800	95,100	105,025	108,200	127,700	153,700
DEFENSE AGENCIES ...	37,244	34,900	30,732	31,900	35,646	39,149	59,340	85,051	101,690	93,890
DEPT OF EDUCATION 1/..	11,449	4,966	1,894	5,081	11,880	18,276	20,567	17,583	17,338	13,489
DEPT OF ENERGY 2/.....	275,156	269,504	312,758	345,790	389,450	440,534	462,968	523,136	594,696	681,712
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	655,899	845,099	901,853	981,091	1,107,615	1,274,063	1,576,011	1,762,668	1,871,632	2,016,970
NAT'L INST OF HEALTH	592,966	775,300	828,520	920,312	1,032,776	1,181,094	1,463,703	1,642,341	1,745,645	1,883,650
OTHER HHS	62,933	69,799	73,333	60,779	74,839	92,969	112,308	120,327	125,987	133,320
DEPT OF THE INTERIOR .	48,741	48,681	54,944	54,330	63,579	65,876	72,522	71,634	77,343	79,246
DEPT OF TRANSPORTATION	166	275	75	-	-	-	-	-	500	-
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	9,030	9,500	17,400	13,700	8,296	6,010	10,100	13,600	14,200	13,800
NATIONAL AERONAUTICS & SPACE ADMIN	350,279	305,857	309,335	293,209	413,774	479,729	512,847	559,113	540,394	593,018
NAT'L SCI FOUNDATION .	392,442	415,217	485,989	523,634	624,900	678,040	733,255	815,246	873,640	945,444
SMITHSONIAN INST	24,041	24,713	24,785	25,735	29,651	34,896	36,901	41,006	45,188	50,489
VETERANS ADMIN	3,195	3,560	3,880	8,900	9,095	8,891	9,523	14,300	15,000	15,100
ALL OTHER	5,527	4,074	13,156	6,727	10,394	27,369	18,124	23,969	22,346	20,152

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 29. FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY PERFORMER: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

PERFORMER	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL	2,241,675	2,398,189	2,600,383	2,778,727	3,269,497	3,710,659	4,205,516	4,688,153	5,036,672	5,550,973
FEDERAL INTRAMURAL 1/.	617,126	705,047	744,912	796,880	924,726	1,039,576	1,099,604	1,193,332	1,289,146	1,424,158
INDUSTRIAL FIRMS 2/...	215,542	155,508	166,363	190,888	261,195	313,350	344,465	396,521	386,435	447,522
UNIVS & COLLEGES	1,048,741	1,146,107	1,261,165	1,342,148	1,555,282	1,760,645	2,081,175	2,322,233	2,524,146	2,760,851
FFRDC'S ADMIN BY UNIV & COL	228,984	223,098	257,548	284,884	324,119	356,772	393,607	436,824	488,310	550,369
NONPROFIT INSTS 2/....	101,938	133,277	142,058	134,386	168,175	198,642	247,391	287,269	292,151	312,389
STATE & LOCAL GOV	16,194	16,812	14,009	12,914	15,603	17,050	19,758	23,875	24,816	27,482
FOREIGN	13,150	18,340	14,328	16,627	20,397	24,624	19,516	28,099	31,668	28,202

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 30. FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL FIELDS	2,241,675	2,398,189	2,600,383	2,778,727	3,269,497	3,710,659	4,205,516	4,688,153	5,036,672	5,550,973
LIFE SCIENCES	888,396	1,032,164	1,115,929	1,222,015	1,383,365	1,588,390	1,891,777	2,054,425	2,203,898	2,407,101
PSYCHOLOGY	45,364	46,124	58,642	45,529	55,717	84,049	75,069	84,206	87,394	98,275
PHYSICAL SCIENCES	628,210	649,605	708,959	721,435	889,994	942,385	1,051,038	1,221,660	1,314,413	1,481,331
ENVIRONMENTAL SCIENCES	283,080	302,150	292,719	305,598	398,311	461,405	468,063	534,213	560,326	615,918
MATH & COMPUTER SCI ..	60,082	52,739	62,007	81,805	83,408	98,340	104,805	116,928	138,571	162,731
ENGINEERING	220,760	214,872	262,847	272,799	337,683	376,346	435,053	465,630	520,040	611,840
SOCIAL SCIENCES	80,197	74,831	73,757	86,426	95,513	124,347	129,718	147,180	144,485	125,054
OTHER SCIENCES, NEC ..	35,586	25,704	25,523	43,120	25,506	35,397	49,993	63,911	67,545	48,723

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 31. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH BY AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL AGENCIES ..	3,339,754	3,777,051	4,129,325	4,840,605	5,244,618	5.896,099	6,329,489	6,909,225	7,322,622	7,982,850
DEPT OF AGRICULTURE ..	211,380	219,453	247,760	270,853	319,570	351,780	375,500	381,785	419,434	462,838
DEPT OF COMMERCE	113,842	111,000	124,355	133,439	152,970	168,914	194,707	224,526	225,173	192,016
DEPT OF DEFENSE, TOTAL	1,129,368	1,131,465	1,130,942	1,200,596	1,342,591	1.413,648	1,542,571	1,721,428	1,971,079	2,426,176
ARMY	300,231	290,149	264,682	281,009	298,954	305,737	333,570	347,065	370,680	447,140
NAVY	273,658	287,137	287,789	308,277	343,593	354,229	375,193	396,200	461,100	526,400
AIR FORCE	261,058	264,148	276,901	298,376	340,975	353,645	387,228	429,100	480,500	513,600
DEFENSE AGENCIES ...	291,230	287,339	299,902	312,234	357,769	392,537	446,580	549,063	658,799	939,036
OTHER DEFENSE	3,191	2,692	1,668	700	1,300	7,500	-	-	-	-
DEPT OF EDUCATION 1/..	11,317	11,015	7,990	28,182	28,169	30,967	72,825	69,992	69,974	39,624
DEPT OF ENERGY 2/.....	149,628	195,244	280,673	400,709	501,816	661,709	668,878	754,190	812,748	939,104
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	765,534	985,612	1,013,093	1,136,379	1,266,616	1.417,411	1,439,658	1,570,109	1,598,834	1,681,755
NAT'L INST OF HEALTH	539,084	714,340	775,697	847,380	935,882	1,051,502	1,066,408	1,145,129	1,188,645	1,270,400
OTHER HHS	226,450	271,272	237,396	288,999	330,734	365,909	373,250	424,980	410,189	411,355
DEPT OF THE INTERIOR .	111,420	94,817	179,109	205,128	192,363	217,616	266,946	282,812	287,008	273,597
DEPT OF TRANSPORTATION	77,070	61.506	53,769	31.100	51,760	66,500	66,983	82,445	91,141	91,590
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	65,257	86,794	124,311	141,695	196,956	246,660	248,900	231,500	245,700	201,400
NATIONAL AERONAUTICS & SPACE ADMIN	443,641	539,810	625,804	929,632	792,302	865,438	938,389	1,050,531	1,014,172	1,060,930
NAT'L SCI FOUNDATION .	71,511	105,039	84,026	72,142	63,400	65,462	66,770	58,441	59,764	54,456
NUCLEAR REGULATORY COMMISSION	-	42,338	64,155	88,432	112,291	133,891	148,772	182,672	207,673	224,540
VETERANS ADMIN	66,535	75,168	83,260	76,227	83,247	90,509	101,839	103,600	114,200	121,800
ALL OTHER	123,251	117,790	110,078	126,091	140,567	165,594	196,751	195,194	205,722	213,024

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 32. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY PERFORMER: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

PERFORMER	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL	3,339,754	3,777,051	4,129,325	4,840,605	5,244,618	5,896,099	6,329,489	6,909,225	7,322,622	7,982,850
FEDERAL INTRAMURAL 1/.	1,471,347	1,565,140	1,718,868	2,082,286	2,032,940	2,181,186	2,381,628	2,472,940	2,592,618	2,770,733
INDUSTRIAL FIRMS 2/...	740,500	817,317	979,584	1,088,575	1.298,230	1.573,229	1,662,466	1,992.115	2,204,725	2,583,932
UNIVS & COLLEGES	642,314	812,160	817,601	907,587	1,028,225	1,167,394	1,252,200	1,376,838	1,417,052	1,419,338
FFRDC'S ADMIN BY UNIV & COL	126,182	150,868	167,964	263,394	346,185	358,078	406,994	414,331	443,826	544,861
NONPROFIT INSTS 2/....	264,479	331,649	317,434	358.546	399,540	459,135	448,604	462,896	461,530	461,876
STATE & LOCAL GOV	68,095	74,212	97,898	106,457	99,574	111,777	119,708	127,057	125,625	115,032
FOREIGN	26,837	25,705	29,976	33,760	39,924	45,300	57,889	63,048	77,246	87,078

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 33. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL FIELDS	3,339,754	3,777,051	4,129,325	4,840,605	5,244,618	5,896,099	6,329,489	6,909,225	7,322,622	7,982,850
LIFE SCIENCES	1,042,705	1,232,976	1,339,266	1,427,681	1,624,384	1,838,743	1,956,504	2,137,910	2,232,044	2,307,248
PSYCHOLOGY	64,560	87,295	80,550	98,467	100,484	109,194	122,315	114,803	118,571	129,942
PHYSICAL SCIENCES	353,530	366,464	387,685	537,457	640,177	703,262	741,516	778,952	919,414	1,162,798
ENVIRONMENTAL SCIENCES	297,447	334,177	434,550	463,686	507,690	563,161	632,921	726,744	715,385	761,048
MATH & COMPUTER SCI ..	54,680	61,529	63,253	75,989	112,472	117,940	105,496	124,015	145,485	159,050
ENGINEERING	1,149,821	1,348,861	1,454,930	1,795,856	1,775,234	2,028,249	2,136,577	2,364,501	2,507,067	2,763,982
SOCIAL SCIENCES	218,593	217,365	228,059	306,030	330,612	365,139	397,592	376,631	372,843	360,173
OTHER SCIENCES, NEC ..	158,418	128,384	141,032	135,439	153,565	170,411	236,568	285,669	311,813	338,609

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 34. FEDERAL OBLIGATIONS FOR DEVELOPMENT BY AGENCY: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES	
									1981	1982
TOTAL, ALL AGENCIES ..	11,218,724	11,234,888	12,309,110	13,160,326	15,468,858	16,780,533	18,442,741	20,083,020	23,001,175	27,068,176
DEPT OF AGRICULTURE ..	12,416	13,642	18,138	20,225	22,943	26,798	31,105	30,151	31,601	34,308
DEPT OF COMMERCE	60,445	51,396	70,962	73,140	68,592	90,890	89,901	88,116	79,426	59,304
DEPT OF DEFENSE, TOTAL	6,968,135	6,985,978	7,581,465	8,127,241	9,247,506	9,729,580	10,492,127	11,719,243	14,280,087	18,375,024
ARMY	1,636,488	1,643,367	1,560,370	1,651,258	2,043,873	2,139,117	2,320,064	2,500,732	2,777,137	3,380,752
NAVY	2,268,406	2,317,189	2,693,674	2,890,055	3,320,048	3,472,099	3,767,727	4,095,032	4,360,280	5,249,186
AIR FORCE	2,932,558	2,874,564	3,157,653	3,344,325	3,605,320	3,813,604	4,033,363	4,673,729	6,587,757	8,875,142
DEFENSE AGENCIES ...	105,607	126,642	145,903	217,513	248,026	276,200	341,663	411,870	517,944	820,913
OTHER DEFENSE	25,076	24,216	23,865	24,090	30,239	28,560	29,310	37,880	36,969	49,031
DEPT OF EDUCATION 1/..	142,354	111,237	106,393	89,699	56,957	74,529	72,896	51,797	49,935	42,787
DEPT OF ENERGY 2/.....	938,412	1,024,155	1,453,875	1,717,310	2,644,954	3,142,584	3,506,920	3,476,362	3,519,284	3,069,417
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	251,025	332,185	366,235	343,131	352,060	392,008	489,211	447,444	434,299	469,863
NAT'L INST OF HEALTH	182,148	247,144	275,655	292,555	311,201	348,266	423,022	394,360	394,055	416,771
OTHER HHS	68,877	85,041	90,580	50,576	40,859	43,742	66,189	53,084	40,244	53,092
DEPT OF THE INTERIOR .	83,585	48,929	69,276	73,740	58,740	75,482	66,310	56,812	58,582	44,946
DEPT OF TRANSPORTATION	233,404	308,008	257,719	263,400	302,844	341,750	303,106	278,785	307,785	312,410
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	106,305	72,919	115,946	103,743	90,198	131,966	151,100	99,900	103,200	87,400
NATIONAL AERONAUTICS & SPACE ADMIN	2,266,967	2,156,505	2,129,274	2,223,989	2,497,309	2,530,247	2,959,772	3,474,410	3,853,122	4,363,452
NAT'L SCI FOUNDATION .	15,940	36,157	25,006	13,480	8,719	5,273	7,900	8,105	4,000	-
VETERANS ADMIN	4,541	6,077	7,667	12,552	14,659	14,591	15,642	15,500	16,700	16,000
ALL OTHER	135,195	87,700	107,154	98,676	103,377	224,835	256,751	336,395	263,154	193,265

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1973-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1973 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 35. FEDERAL OBLIGATIONS FOR DEVELOPMENT, BY PERFORMER: FISCAL YEARS 1973-82

(THOUSANDS OF DOLLARS)

PERFORMER	1973	1974	1975	1976	1977	1978	1979	1980	ESTIMATES 1981	ESTIMATES 1982
TOTAL	11,218,724	11,234,888	12,309,110	13,160,326	15,468,858	16,780.533	18,442,741	20,083,020	23,001,175	27,068,176
FEDERAL INTRAMURAL 1/.	2,673,684	2,640,714	2,890,182	2,889,553	3,146,959	3,699,190	4,081,699	4,263,130	5,136,081	5,800,904
INDUSTRIAL FIRMS 2/...	7,357,601	7,372,339	7,980,947	8,874,675	10,688,654	11,165,840	12,133,648	13,441,404	15,389,826	18,855,724
UNIVS & COLLEGES	225,549	255,690	332,666	302,066	325,353	449,570	560,731	577,861	574,784	597,529
FFRDC'S ADMIN BY UNIV & COL	370,144	415,170	509,564	512,837	656,505	610,779	710,398	740,418	793,435	787,441
NONPROFIT INSTS 2/....	394,824	406,622	462,768	446,689	500,656	662,327	708,353	825,539	871,034	763,897
STATE & LOCAL GOV	172,552	123.345	115,711	111,794	122,867	139.583	170,655	114,610	111,392	79,938
FOREIGN	24,370	21,008	17.272	22,712	27,864	53.244	77,257	120,058	124,623	182,743

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 36. R&D scientists and engineers employed in the Federal Government by broad field categories:[1] selected years

	1967	1969	1971	1973	1975	1977	1978	1979
Total	65,500	68,500	67,200	61,800	63,400	64,700	66,300	66,700
Military total	12,900	13,900	12,000	8,000	7,700	7,300	7,400	7,400
Civilian total	52,600	54,600	55,200	53,800	55,700	57,400	58,900	59,300
Scientists	27,300	28,300	27,700	27,000	28,000	28,900	29,700	29,900
Physical and environmental scientists	16,000	16,600	15,300	14,900	15,300	15,500	15,900	16,000
Life scientists.................	5,900	6,100	6,300	6,200	6,400	6,900	7,100	7,200
Mathematicians and statisticians	3,100	3,200	3,500	3,400	3,600	3,700	3,800	3,800
Social scientists[2]	1,500	1,600	1,500	1,500	1,600	1,600	1,700	1,700
Psychologists.................	800	800	1,100	1,000	1,100	1,200	1,200	1,200
Engineers	25,300	26,300	27,500	26,800	27,700	28,500	29,200	29,400

[1] Includes R&D administrators, R&D grant and contract administrators, and S/E personnel directly engaged in R&D activities; also included are uniformed military S/E personnel, the bulk of whom are assumed to be engaged in R&D activities. Data are calculated on a full-time-equivalent basis.

[2] Includes the fields of economics, sociology, anthropology, geography, cartography, and community planning.

NOTE: Data on military S/E personnel are estimated; detailed data on fields are estimated for some years based on totals provided by the Office of Personnel Management.

SOURCES: National Science Foundation based on data of the Office of Personnel Management and the Department of Defense

Table 37. Funds for industrial R&D performance by source: 1969-80

[Dollars in millions]

Year	Total R&D		Federal			Company		
	Current dollars	Constant 1972 dollars[1]	Current dollars	Constant 1972 dollars[1]	Percent of total	Current dollars	Constant 1972 dollars[1]	Percent of total
1969	18,308	21,094	8,451	9,737	46	9,857	11,357	54
1970	18,067	19,756	7,779	8,506	43	10,288	11,249	57
1971	18,320	19,081	7,666	7,985	42	10,654	11,097	58
1972	19,552	19,552	8,017	8,017	41	11,535	11,535	59
1973	21,249	20,106	8,145	7,706	38	13,104	12,399	62
1974	22,887	19,915	8,220	7,152	36	14,667	12,763	64
1975	24,187	19,263	8,605	6,853	36	15,582	12,410	64
1976	26,997	20,435	9,561	7,237	35	17,436	13,198	65
1977	29,928	21,403	10,521	7,524	35	19,407	13,879	65
1978	33,365	22,236	11,209	7,470	34	22,156	14,766	66
1979	38,147	23,436	12,492	7,675	33	25,655	15,761	67
1980	43,879	24,740	13,939	7,859	32	29,940	16,881	68

[1] Based on the GNP implicit price deflator.

SOURCE: National Science Foundation

Table 38. Funds for industrial R&D performance by industry: 1969-80

[Dollars in millions]

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total	....	18,308	18,067	18,320	19,552	21,249	22,887	24,187	26,997	29,928	33,365	38,147	43,879
Food and kindred products	20	199	230	240	259	269	298	335	355	395	429	459	517
Textiles and apparel	22-23	60	58	59	61	64	69	70	82	81	84	93	102
Lumber, wood products, and furniture	24-25	18	52	53	64	71	84	88	107	127	133	151	165
Paper and allied products	26	188	178	187	189	194	237	249	313	336	391	454	506
Chemicals and allied products	28	1,660	1,773	1,832	1,932	2,116	2,450	2,727	3,017	3,256	3,584	4,033	4,608
Industrial chemicals	281-82,286	1,007	1,031	1,009	1,031	1,119	1,299	1,391	1,524	1,685	1,835	2,023	2,273
Drugs and medicines	283	444	485	549	607	698	807	981	1,091	1,154	1,270	1,445	1,665
Other chemicals	284-85,287-89	209	257	274	294	299	344	354	401	417	479	565	670
Petroleum and refining	29	467	515	505	468	498	622	693	767	918	1,060	1,275	1,565
Rubber products	30	261	276	289	377	426	469	467	502	491	468	571	646
Stone, clay, and glass products	32	159	167	164	183	199	217	233	263	287	321	352	401
Primary metals	33	257	275	272	277	307	358	443	506	534	549	613	693
Ferrous metals and products	331-32, 3398-99	136	149	144	146	163	181	215	256	261	266	293	318
Nonferrous metals and products	333-36	121	126	128	130	145	177	228	250	273	283	320	375
Fabricated metal products	34	182	207	242	253	291	313	324	358	394	396	479	586
Machinery	35	1,546	1,729	1,860	2,158	2,549	2,985	3,196	3,487	3,967	4,480	5,131	6,076
Office, computing, and accounting machines	357	(1)	(1)	(1)	1,456	1,733	2,103	2,220	2,402	2,766	3,134	3,611	4,287
Other machinery except electrical	35 (Balance)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	1,201	1,346	1,520	1,789
Electrical equipment	36	4,347	4,220	4,389	4,680	4,902	5,011	5,105	5,636	5,937	6,612	7,927	9,137
Radio and TV receiving equipment	365	57	70	64	48	49	51	50	52	61	52	62	69
Electronic components	367	2,670	2,604	2,731	330	406	489	549	691	748	843	1,053	1,354
Communication equipment	366				2,583	2,613	2,424	2,385	2,511	2,809	3,190	3,951	4,510
Other electrical equipment	361-64,369	1,620	1,546	1,594	1,719	1,834	2,047	2,121	2,382	2,318	2,527	2,861	3,184
Motor vehicles and motor vehicles equipment	371	1,568	1,591	1,768	1,954	2,405	2,389	2,340	2,778	3,325	3,841	4,421	4,843
Other transportation equipment	373-75,379				56	72	87	90	94	119	128	154	155
Aircraft and missiles	372,376	5,878	5,219	4,881	4,950	5,052	5,278	5,713	6,339	7,104	7,690	8,290	9,626
Professional and scientific instruments	38	742	744	746	836	961	1,075	1,173	1,331	1,487	1,758	2,054	2,270
Scientific and mechanical measuring instruments	381-82	123	131	133	163	186	221	266	325	390	493	601	735
Optical, surgical, photographic, and other instruments	383-87	619	613	612	675	775	854	907	1,007	1,097	1,265	1,453	1,535
Other manufacturing industries	21,27,31,39	121	128	131	146	158	177	205	217	250	283	317	410
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	655	705	704	707	715	768	735	845	921	1,138	1,373	1,569

[1] Data not tabulated at this level prior to 1972.

[2] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 39. Federal funds for industrial R&D performance by industry: 1969-80

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total	....	8,451	7,779	7,666	8,017	8,145	8,220	8,605	9,561	10,521	11,209	12,492	13,939
Food and kindred products	20	1	3	2	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22-23	(1)	(1)	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24-25	0	0	(1)	(1)	(1)	(1)	0	0	0	0	0	0
Paper and allied products	26	(1)	(1)	(1)	2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	192	180	184	189	203	214	236	266	300	366	378	407
Industrial chemicals	281-82,286	165	158	159	171	183	194	218	249	284	347	360	386
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	10	22	17	15	14	20	(1)	52	76	121	155	151
Rubber products	30	65	71	69	123	146	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	1	11	10	14	15	14	(1)	(1)	(1)	(1)	(1)	(1)
Primary metals	33	10	10	6	12	11	8	21	26	25	28	32	38
Ferrous metals and products	331-32,3398-99		1	2	3	4	(1)	3	4	4	5	5	5
Nonferrous metals and products	333-36	9	9	4	10	7	(1)	17	22	21	23	27	33
Fabricated metal products	34	8	7	11	12	13	14	27	38	45	37	43	53
Machinery	35	260	262	315	401	429	511	509	532	576	592	670	856
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	(1)	(1)	486	509	546	552	623	794
Other machinery, except electrical	35 (Balance)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	30	40	47	61
Electrical equipment	36	2,390	2,211	2,258	2,367	2,410	2,307	2,307	2,555	2,699	2,871	3,412	3,723
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	0	0	0	0	0
Electronic components	367	1,557	1,420	1,479	125	146	184	(1)	(1)	(1)	(1)	(1)	(1)
Communication equipment	366				1,417	1,362	1,137	1,057	1,093	1,202	1,314	1,899	1,807
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	290	314	309	293	385	288	318	383	438	493	678	603
Other transportation equipment	373-75,379				26	39	47	47	(1)	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	4,524	4,005	3,864	3,970	3,899	4,000	4,428	4,921	5,541	5,811	5,997	6,896
Professional and scientific instruments	38	237	194	164	161	160	167	172	163	174	183	223	131
Scientific and mechanical measuring instruments	381-82	32	20	14	13	11	10	15	15	22	26	35	44
Optical, surgical, photographic, and other instruments	383-87	205	174	150	148	149	157	157	148	152	157	188	87
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	(1)	(1)	7	5	6	9	14	48
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	448	480	452	431	416	463	310	375	415	522	669	774

[1] Not separately available but included in total.
[2] Data not tabulated at this level prior to 1972.
[3] Data not tabulated at this level prior to 1977.
SOURCE: National Science Foundation

Table 40. Company funds for industrial R&D performance by industry: 1969-80

[Dollars in millions]

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total	....	9,857	10,288	10,654	11,535	13,104	14,667	15,582	17,436	19,407	22,156	25,655	29,940
Food and kindred products	20	192	227	238	258	298	297	(1)	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22-23	(1)	(1)	59	61	63	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24-25	18	52	(1)	(1)	(1)	(1)	88	106	127	133	151	165
Paper and allied products	26	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	1,465	1,593	1,648	1,741	1,913	2,236	2,490	2,751	2,956	3,218	3,655	4,201
Industrial chemicals	281-82,286	842	873	850	860	936	1,105	1,173	1,275	1,402	1,468	1,633	1,867
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	457	493	488	454	485	603	(1)	715	842	939	1,120	1,414
Rubber products	30	196	205	221	255	260	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	158	156	153	168	184	203	(1)	(1)	(1)	(1)	(1)	(1)
Primary metals	33	247	265	266	264	297	350	422	481	507	521	581	655
Ferrous metals and products	331-32,3398-99	135	148	142	144	159	(1)	211	252	256	261	298	313
Nonferrous metals and products	333-36	112	117	124	121	138	(1)	211	229	251	260	293	342
Fabricated metal products	34	174	201	230	243	279	299	297	322	349	350	436	535
Machinery	35	1,286	1,469	1,545	1,758	2,120	2,473	2,687	2,955	3,391	3,888	4,461	5,221
Office, computing, and accounting machines	357	(2)	(2)	(2)	(1)	(1)	(1)	1,734	1,893	2,220	2,582	2,968	3,483
Other machinery, except electrical	35 (Balance)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	1,171	1,306	1,473	1,728
Electrical equipment	36	1,957	2,008	2,131	2,313	2,491	2,704	2,798	3,081	3,238	3,741	4,515	5,414
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	52	61	52	62	69
Electronic components	367	} 1,113	1,183	1,252	{ 205	260	306	(1)	(1)	(1)	(1)	(1)	(1)
Communication equipment	366				1,165	1,251	1,287	1,328	1,418	1,607	1,876	2,252	2,703
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	} 1,278	1,278	1,461	{ 1,661	2,020	2,101	2,022	2,395	2,867	3,348	3,743	4,240
Other transportation equipment	373-75,379				29	33	40	43	(1)	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	1,354	1,213	1,017	978	1,154	1,278	1,285	1,418	1,563	1,879	2,293	2,730
Professional and scientific instruments	38	505	550	583	676	801	908	1,001	1,168	1,313	1,575	1,831	2,139
Scientific and mechanical measuring instruments	381-82	91	111	120	151	175	211	251	309	368	467	566	691
Optical, surgical, photographic, and other instruments	383-87	414	439	463	527	626	697	750	859	945	1,108	1,285	1,448
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	(1)	(1)	198	212	245	274	303	362
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	207	225	252	277	299	305	425	471	506	616	704	795

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[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 41. R&D funds as percent of net sales in R&D-performing manufacturing companies by industry: 1969-80

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total	....	4.0	3.7	3.5	3.4	3.3	3.1	3.1	3.1	3.1	3.2	3.0	3.1
Food and kindred products	20	.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4
Textiles and apparel	22-23	.6	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4
Lumber, wood products, and furniture	24-25	.4	.6	.7	.8	.7	.8	.7	.7	.8	.7	.7	.8
Paper and allied products	26	1.0	.9	.9	.8	.7	.8	.9	1.0	.9	1.0	1.0	1.1
Chemicals and allied products	28	3.9	3.9	3.7	3.6	3.5	3.5	3.7	3.7	3.7	3.6	3.4	3.5
Industrial chemicals	281-82,286	4.0	4.2	3.9	3.9	3.6	3.3	3.6	3.7	3.5	3.5	3.2	3.3
Drugs and medicines	283	6.0	6.7	6.2	6.5	6.5	6.3	6.4	6.3	6.4	6.3	6.1	6.2
Other chemicals	284-85,287-89	2.0	1.8	1.9	1.7	1.6	1.6	1.7	1.7	1.8	1.8	1.8	2.0
Petroleum refining	29	.9	1.0	.9	.8	.7	.6	.7	.6	.7	.8	.7	.6
Rubber products	30	2.2	2.3	2.2	2.6	2.6	2.5	2.5	2.4	2.1	1.9	1.9	2.2
Stone, clay, and glass products	32	1.7	1.8	1.8	1.7	1.7	1.7	1.2	1.2	1.2	1.3	1.2	1.3
Primary metals	33	.8	.8	.8	.7	.7	.6	.8	.8	.7	.6	.6	.6
Ferrous metals and products	331-32,3398-99	.7	.7	.7	.6	.5	.5	.6	.6	.6	.5	.5	.5
Nonferrous metals and products	333-36	1.0	1.0	1.0	.9	.9	1.0	1.2	1.2	1.0	.9	.8	.8
Fabricated metal products	34	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.3
Machinery	35	3.8	4.0	4.0	4.3	4.6	4.6	4.8	4.9	5.1	5.0	5.1	5.6
Office, computing, and accounting machines	357	(¹)	(¹)	(¹)	11.1	11.6	12.6	12.0	11.6	11.9	11.6	11.8	12.2
Other machinery, except electrical	35 (Balance)	(²)	(²)	(²)	(²)	(²)	(²)	(²)	(²)	2.2	2.2	2.2	2.4
Electrical equipment	36	7.9	7.3	7.2	7.1	6.9	6.6	6.5	6.7	6.2	6.3	6.4	6.5
Radio and TV receiving equipment	365	2.2	2.7	2.4	1.6	1.7	1.7	1.4	1.4	1.4	1.1	1.2	1.6
Electronic components	367	9.7	8.2	8.2	5.9	6.2	6.2	6.9	7.3	6.9	8.0	6.8	7.6
Communication equipment	366				8.7	8.1	7.6	7.6	7.6	7.6	7.7	8.4	8.6
Other electrical equipment	361-64,369	6.6	6.6	6.4	6.3	6.3	6.3	6.0	6.3	5.3	5.3	5.0	5.0
Motor vehicles and motor vehicles equipment	371	3.1	3.5	3.1	3.3	3.5	3.7	3.5	3.2	3.1	3.3	3.8	5.0
Other transportation equipment	373-75,379				1.0	1.2	1.3	1.3	1.3	1.5	1.4	1.8	1.7
Aircraft and missiles	372,376	20.2	16.2	16.2	16.6	13.3	14.1	12.7	12.7	12.8	12.2	11.4	11.6
Professional and scientific instruments	38	6.4	5.7	5.7	5.9	6.1	6.1	5.9	6.2	6.1	6.1	6.2	6.0
Scientific and mechanical measuring instruments	381-82	3.8	3.5	3.7	4.1	4.3	4.5	4.9	5.4	5.9	5.8	5.7	6.1
Optical, surgical, photographic, and other instruments	383-87	7.4	6.6	6.4	6.6	6.8	6.7	6.3	6.4	6.2	6.3	6.4	5.9
Other manufacturing industries	21,27,31,39	.8	.8	.8	.8	.8	.9	.8	.7	.7	.7	.7	.9

[1] Data not tabulated at this level prior to 1972.

[2] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

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Table 42. Company R&D funds as percent of net sales in R&D-performing manufacturing companies by industry: 1969-80

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total	....	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1
Food and kindred products	20	.4	.4	.4	.4	.4	.4	(1)	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22-23	(1)	(1)	.5	.4	.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24-25	.3	.8	(1)	(1)	(1)	(1)	.7	.7	.8	.7	.7	.8
Paper and allied products	26	(1)	(1)	(1)	.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	3.4	3.5	3.3	3.3	3.1	3.0	3.1	3.3	3.3	3.2	3.1	3.2
Industrial chemicals	281-82,286	3.4	3.6	3.3	3.2	3.0	2.8	3.1	3.1	3.0	2.8	2.6	2.7
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	.9	.9	.8	.7	.7	.5	(1)	.8	.6	.7	.6	.5
Rubber products	30	1.8	1.7	1.7	1.7	1.7	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	1.7	1.7	1.6	1.6	1.5	1.5	(1)	(1)	(1)	(1)	(1)	(1)
Primary metals	33	.8	.8	.8	.7	.6	.5	.7	.8	.7	.6	.6	.6
Ferrous metals and products	331-32, 3398-99	.7	.7	.7	.6	.5	(1)	.6	.6	.6	.5	.5	.5
Nonferrous metals and products	333-36	.9	.9	1.0	.9	.8	(1)	1.1	1.1	.9	.8	.7	.7
Fabricated metal products	34	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.2
Machinery	31		3.4	3.3	3.5	3.8	3.8	4.0	4.2	4.4	4.4	4.4	4.8
Office, computing, and accounting machines	357	(2)	(2)	(2)	(1)	(1)	(1)	9.4	9.1	9.5	9.6	9.8	10.0
Other machinery, except electrical	Balance of 35	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	2.1	2.1	2.1	2.3
Electrical equipment	36	3.5	3.4	3.5	3.5	3.5	3.5	3.6	3.7	3.4	3.6	3.6	3.9
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	1.4	1.4	1.4	1.1	1.2	1.6
Electronic components	367	4.0	3.7	3.8	3.7	3.9	3.9	(1)	(1)	(1)	(1)	(1)	(1)
Communication equipment	366				3.9	3.9	3.9	4.2	4.3	4.4	4.5	4.8	5.2
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	2.6	2.8	2.5	2.8	2.9	3.2	3.0	2.7	2.7	2.9	3.2	4.3
Other transportation equipment	373-75,379				.6	.6	.6	.6	.6	.7	(1)	(1)	(1)
Aircraft and missiles	372,376	4.6	3.8	3.4	3.3	3.0	3.5	2.8	2.8	2.8	3.0	3.2	3.1
Professional and scientific instruments	38	4.4	4.2	4.5	4.8	5.1	5.2	5.1	5.4	5.4	5.5	5.5	5.6
Scientific and mechanical measuring instruments	381-82	2.8	2.9	3.3	3.8	4.0	4.4	4.7	5.3	5.5	5.5	5.4	5.7
Optical, surgical, photographic, and other instruments	383-87	5.0	4.7	4.9	5.1	5.5	5.5	5.2	5.5	5.3	5.5	5.6	5.8
Other manufacturing industries	21,27,31,39	.7	.8	(1)	(1)	(1)	(1)	.7	.7	.7	.7	.7	.8

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 43. Funds for the performance of industrial basic research by industry: 1969-79

[Dollars in millions]

Industry	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[4]
Total		618	602	590	593	631	699	730	819	911	1,155
Food and kindred products	20	16	16	25	13	11	9	11	18	19	15
Textiles and apparel	22-23	2	2	2	2	1	2	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24-25	(1)	(1)	(1)	(1)	(1)	(1)	3	5	7	5
Paper and allied products	26	4	5	4	4	5	7	5	6	9	18
Chemicals and allied products	28	208	207	216	214	236	288	294	304	336	386
Industrial chemicals	281-82, 286	(1)	(1)	118	117	125	157	154	154	165	201
Drugs and medicines	283	67	93	77	78	90	107	112	119	131	139
Other chemicals	284-85, 287-89	14	18	21	19	21	24	27	32	40	(1)
Petroleum refining and extraction	29	38	26	21	22	26	33	36	44	48	74
Rubber products	30	8	5	4	6	3	5	4	7	9	18
Stone, clay, and glass products	32	(1)	(1)	14	18	20	21	32	38	41	40
Primary metals	33	16	18	17	9	8	9	14	16	15	24
Ferrous metals and products	331-32, 3398-99	(1)	(1)	(1)	(1)	(1)	(1)	4	5	5	10
Nonferrous metals and products	333-36	8	8	(1)	(1)	(1)	(1)	10	12	10	14
Fabricated metal products	34	3	5	(1)	7	11	3	5	2	2	4
Machinery	35	21	21	22	24	24	28	32	56	59	69
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	(1)	(1)	28	38	43	55
Other machinery except electrical	35 (Balance)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	16	14
Electrical equipment and communication	36	133	139	138	137	143	143	142	163	181	226
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Electronic components	367	117	122	120	10	8	5	4	5	6	7
Communication equipment and communication	366				108	117	116	119	130	146	182
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	(1)	(1)	21	10	8	9	10	8	12	(1)
Other transportation equipment	373-75,379				(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	65	63	50	62	58	57	54	54	56	90
Professional and scientific instruments	38	(1)	(1)	19	17	15	16	16	23	22	(1)
Scientific and mechanical measuring instruments	381-82	(1)	(1)	7	6	5	5	9	10	10	(1)
Optical, surgical, photographic, and other instruments	383-87	(1)	(1)	12	11	10	11	8	12	12	(1)
Other manufacturing industries	21,27,31,39	5	4	6	5	6	6	(1)	(1)	(1)	45
Nonmanufacturing industries	07-17,41-47, 49-67,737,739, 807,891	43	38	31	28	28	26	25	29	42	53

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

[4] Data not collected for 1978 and 1980.

SOURCE: National Science Foundation

Table 44. Funds for the performance of industrial basic research by field of science and engineering: 1969-79

[Dollars in millions]

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[2]
Total	618	602	590	593	631	699	730	819	911	1,155
Physical sciences	324	297	281	277	276	319	320	359	405	526
Chemistry	213	196	180	183	193	229	228	253	285	382
Physics	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Astronomy	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mathematics	13	13	14	12	14	13	14	18	19	20
Environmental sciences	11	8	8	6	7	10	15	17	19	13
Atmospheric sciences	(1)	(1)	3	(1)	2	3	6	6	5	5
Geological sciences	(1)	(1)	3	4	3	5	5	7	7	6
Oceanography	(1)	(1)	2	(1)	1	1	3	4	7	2
Engineering (including metallurgy)	170	170	159	183	185	178	191	204	233	292
Life sciences	74	86	94	82	102	119	122	134	156	176
Biological sciences	58	51	57	61	77	83	85	102	128	136
Clinical medical sciences	16	35	37	21	25	36	37	32	28	40
Other sciences	26	28	34	33	47	60	67	85	78	128

[1] Not separately available but included in total.

[2] Data not collected for 1978 and 1980.

SOURCE: National Science Foundation

Table 45. Funds for the performance of industrial applied research: 1971-79

[Millions of constant 1972 dollars[1]]

Year	Funds	Percent change
1971	3,556	−5.1
1972	3,514	−1.2
1973	3,620	+3.0
1974	3,731	+3.1
1975	3,640	−2.4
1976	3,869	+6.3
1977	4,045	+4.5
1978	4,199	+3.8
1979	4,435	+5.6

[1] Based on the GNP implicit price deflator.

SOURCE: National Science Foundation

Table 46. Funds for the performance of applied research and development by product field: 1969-79

[Dollars in millions]

Product field	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[3]
Total		17,690	17,465	17,730	18,959	20,618	22,188	23,457	26,178	29,017	36,992
Atomic energy devices		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ordnance and accessories, n.e.c.	348	186	192	192	177	228	222	187	199	268	316
Guided missiles and spacecraft	376	3,711	3,115	2,832	2,647	2,491	2,486	2,925	2,880	3,035	4,465
Food and kindred products	20	179	206	211	233	250	293	284	321	350	534
Textile mill products	22	66	55	60	83	93	82	73	81	96	(2)
Chemicals, except drugs and medicines	28, except 283	1,214	1,339	1,345	1,250	1,342	1,564	1,627	1,853	2,024	2,501
Industrial inorganic and organic chemicals	281, 286	417	442	457	451	489	589	665	728	822	(2)
Plastics materials and synthetic resins, rubber, and fibers	282	482	521	511	453	511	589	588	674	747	881
Agricultural chemicals	287	104	126	130	108	114	137	176	205	236	292
Other chemicals	284-85, 289	210	223	218	238	229	248	198	246	220	(2)
Drugs and medicines	283	417	474	535	531	605	683	783	883	959	1,089
Petroleum refining and extraction	29	252	272	266	299	319	363	408	425	473	650
Rubber and miscellaneous plastics products	30	163	193	215	279	294	341	324	325	378	407
Stone, clay, and glass products	32	157	128	128	135	162	181	150	171	191	235
Primary metals	33	224	235	230	245	272	311	290	311	327	438
Ferrous metals and products	331-32,3398-99	125	127	114	137	158	156	144	163	172	225
Nonferrous metals and products	333-36	99	108	116	108	114	155	147	148	155	213
Fabricated metal products	34	504	622	701	731	769	903	916	1,025	1,157	1,381
Machinery	35	1,562	1,676	1,783	1,969	2,307	2,689	2,628	3,001	3,572	4,561
Engines and turbines	351	196	204	246	316	360	482	464	477	531	589
Farm machinery and equipment	352	99	89	90	93	120	131	138	168	222	295
Construction, mining, and materials handling	353	154	182	196	206	265	283	285	317	378	632
Metalworking machinery and equipment	354	83	86	84	76	69	74	80	83	126	340
Office, computing, and accounting machines	357	812	863	903	1,028	1,219	1,422	1,339	1,580	1,856	1,961
Other machinery, except electrical	356, 358-59	218	252	264	270	274	297	322	376	458	744
Electrical equipment, except communication	36, except 365-67, and 3825	3,409	3,372	688	775	857	929	774	874	905	980
Electric transmission and distribution equipment	361,3825			181	189	204	239	205	224	225	191
Electrical industrial apparatus	362			187	231	263	264	260	306	299	291
Other electrical equipment and supplies	363-64,369			320	355	390	426	309	344	381	498
Communication equipment and electronic components	365-67			2,927	3,234	3,621	3,896	3,911	4,483	5,036	6,898
Motor vehicles and other transportation equipment	37, except 372,376	1,139	1,138	1,341	1,668	2,014	1,994	1,924	2,283	2,611	(2)
Motor vehicles and equipment	371	1,051	1,046	1,228	1,470	1,824	1,784	1,720	(2)	(2)	(2)
Other transportation equipment	373-75,379	88	90	113	198	190	210	204	193	201	205
Aircraft and parts	372	2,579	2,556	2,486	2,396	2,548	2,420	2,265	2,733	3,125	3,840
Professional and scientific instruments	38, except 3825	814	724	652	847	981	1,090	1,002	1,173	1,276	1,434
Other product fields, not elsewhere classified		1,124	1,194	1,177	1,440	1,465	1,742	2,987	3,179	3,213	4,062

[1] Distributed according to SIC code from 1968 to present.

[2] Not separately available but included in total.

[3] Data not collected for 1978 and 1980.

SOURCE: National Science Foundation

Table 47. Funds for industrial energy R&D performance by primary energy source: 1972-81 (projected)

[Dollars in millions]

Primary energy source	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981 (projected)
Total	750	1,009	1,339	1,774	2,073	2,599	3,026	3,795	4,366	4,753
Fossil fuels	(1)	438	516	550	605	765	860	1,480	1,766	2,033
Oil	(1)	297	329	333	381	[2]454	(1)	[2]800	(1)	(1)
Gas	(1)	51	74	66	68	[2]94	(1)	[2]163	(1)	(1)
Shale	(1)	12	18	19	24	[2]35	(1)	[2]29	(1)	(1)
Coal	(1)	49	65	109	127	[2]177	(1)	[2]414	(1)	(1)
Synthetic fossil fuels	(1)	(1)	21	50	74	[2]116	(1)	[2]310	(1)	(1)
Mining	(1)	(1)	5	9	10	[2]9	(1)	[2]1	(1)	(1)
Other	(1)	(1)	39	50	43	[2]52	(1)	[2]103	(1)	(1)
Other fossil fuels	(1)	29	30	23	5	[2]5	(1)	[2]74	(1)	(1)
Nuclear	(1)	501	601	700	799	935	1,016	1,080	1,195	1,243
Fission	(1)	476	567	659	741	[2]852	(1)	[2]951	(1)	(1)
Fusion	(1)	25	34	41	58	[2]83	(1)	[2]129	(1)	(1)
All other energy	(1)	70	222	524	669	899	1,150	1,235	1,405	1,477
Geothermal	(1)	1	2	6	13	[2]24	(1)	[2]119	(1)	(1)
Solar	(1)	2	7	19	43	[2]65	(1)	[2]257	(1)	(1)
Conservation and utilization	(1)	(1)	137	435	528	[2]694	(1)	542	(1)	(1)
All other sources	(1)	67	76	64	85	[2]116	(1)	318	(1)	(1)

[1] Data not collected for these categories.

[2] Detailed data for 1977 and 1979 were estimated based upon 1) data actually reported in those years, and 2) revised totals for those years which were reported on the 1978 and 1980 survey forms.

SOURCE: National Science Foundation

Table 48. Funds for industrial pollution abatement R&D performance by type of pollution and source of funds: 1973-81 (projected)

[Dollars in millions]

Year	Total		Source of funds		Type of pollution			
	Current dollars	Constant 1972 dollars	Federal	Company	Air[1]	Water	Solid waste	Other
1973	603	571	35	568	461	76	10	56
1974	657	572	51	606	508	60	14	75
1975	647	515	41	606	478	71	23	75
1976	754	571	51	703	569	84	21	80
1977	901	644	56	945	[2]676	[2]97	[2]28	[2]100
1978	1,054	702	76	978	NA	NA	NA	NA
1979	1,237	760	98	1,139	[2]954	[2]120	[2]44	[2]120
1980 (est.)	1,183	667	117	1,066	NA	NA	NA	NA
1981 (projected)	1,209	624	NA	NA	NA	NA	NA	NA

[1] Includes automotive emission, electric power plant emissions, etc.

[2] Detailed data for 1977 and 1979 were estimated based upon 1) data actually reported in those years, and 2) revised totals for those years which were reported on the 1978 and 1980 survey forms.

NOTE: Type of pollution and source of funds are in current dollars.

SOURCE: National Science Foundation

Table 49. Full-time-equivalent number of R&D scientists and engineers by industry: January 1970-81

Industry	SIC code	January											
		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Total (January)		384.2	367.0	350.2	357.7	360.0	363.3	364.4	382.8	403.7	423.2	446.6	470.2
Total (Annual Average)		375.6	368.6	354.0	358.9	361.7	363.9	373.6	393.3	413.5	434.9	456.4	NA
Food and kindred products	20	6.3	6.6	6.5	6.6	6.4	6.8	6.9	6.9	6.9	7.4	7.2	7.4
Textiles and apparel	22-23	2.9	1.8	1.8	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.8	1.7
Lumber, wood products, and furniture	24-25	1.2	1.8	1.8	1.9	2.1	2.3	2.1	2.1	2.2	2.2	2.2	2.3
Paper and allied products	26	5.0	5.0	4.9	4.9	4.9	5.0	5.2	6.3	6.6	7.2	7.5	8.2
Chemicals and allied products	28	40.1	42.7	41.0	40.9	41.8	45.2	44.4	46.4	47.9	49.1	50.0	52.8
Industrial chemicals	281-82,286	21.5	21.8	19.1	19.1	19.1	21.1	20.1	20.6	21.5	21.6	21.3	22.1
Drugs and medicines	283	11.8	12.3	13.1	13.0	14.0	15.6	16.6	17.8	18.9	19.7	20.0	21.1
Other chemicals	284-85,287-89	6.8	8.6	8.8	8.8	8.7	8.5	7.8	8.0	7.4	7.8	8.7	9.6
Petroleum refining	29	9.9	9.2	8.3	8.2	8.2	8.4	8.6	8.9	10.0	10.3	11.0	13.4
Rubber products	30	7.4	6.7	6.7	7.5	7.7	8.4	8.6	9.1	7.9	8.1	(3)	(3)
Stone, clay, and glass products	32	4.6	4.3	4.1	4.2	4.5	4.5	4.6	4.5	5.1	5.2	5.4	(3)
Primary metals	33	6.5	6.6	6.4	6.0	6.4	6.3	8.1	8.4	8.1	8.3	8.8	8.5
Ferrous metals and products	331-32,3398,3399	3.2	3.4	3.4	3.2	3.3	3.3	3.9	3.9	3.7	3.8	4.0	3.6
Nonferrous metals and products	333-36	3.3	3.2	3.0	2.8	3.1	3.0	4.2	4.5	4.4	4.5	4.8	4.9
Fabricated metal products	34	5.9	7.1	6.6	6.7	7.3	7.4	6.8	7.1	7.3	7.4	8.9	9.3
Machinery	35	42.3	42.7	43.7	46.3	51.0	52.8	55.7	55.3	58.2	61.5	63.8	65.2
Office, computing, and accounting machines	357	(1)	(1)	(1)	30.1	34.5	36.1	38.1	37.7	39.3	42.2	43.5	46.1
Other machinery, except electrical	35 (Balance)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	17.6	18.9	19.3	20.3	19.1
Electrical equipment	36	100.6	91.8	83.6	85.4	82.6	82.6	80.3	84.1	85.7	87.7	97.4	105.9
Radio and TV receiving equipment	365	1.9	2.4	2.1	1.4	1.3	1.0	1.1	.9	.9	.8	.9	1.1
Electronic components	367	64.8	60.3	53.2	9.4	9.6	10.6	10.2	13.0	14.2	14.0	18.1	51.2
Communication equipment	366				45.3	42.0	40.2	37.4	38.0	40.6	43.4	47.1	(3)
Other electrical equipment	361-64,369	33.9	29.1	28.3	29.3	29.7	30.8	31.6	32.2	30.0	29.4	31.3	33.7
Motor vehicles and motor vehicles equipment	371	25.5	28.2	29.7	28.2	27.4	26.0	25.4	28.2	30.7	32.9	34.4	30.4
Other transportation equipment	373-75,379				1.7	1.8	1.9	1.7	1.9	1.9	2.0	1.5	1.4
Aircraft and missiles	372,376	92.2	78.2	70.8	72.1	70.6	67.5	66.9	72.0	82.0	86.5	86.8	96.1
Professional and scientific instruments	38	15.0	15.1	15.2	16.3	17.5	17.9	18.8	20.5	22.2	24.3	27.3	27.1
Scientific and mechanical measuring instruments	381-82	4.1	4.6	4.7	5.3	5.6	5.9	6.7	7.2	7.9	9.0	(3)	11.0
Optical, surgical, photographic, and other instruments	383-87	10.9	10.5	10.5	11.0	11.9	12.0	12.1	13.3	14.3	15.3	16.3	16.0
Other manufacturing industries	21,27,31,39	2.6 19.2	3.8	3.6	3.6	3.7	3.7	4.2	4.5	4.6	4.8	4.7	5.0
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	16.3	15.6	15.7	15.3	14.4	14.9	14.6	15.3	14.7	16.6	18.9	20.8

[1] Data not tabulated at this level prior to 1972.
[2] Data not tabulated at this level prior to 1977.
[3] Not separately available but included in total.
NA = Not available.
SOURCE: National Science Foundation

Table 50. Full-time-equivalent R&D scientists and engineers per 1,000 employees by industry: 1969-80

Industry and size of company	SIC code	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980[1]
Total		26	26	26	24	24	25	26	27	27	28	28	29
Food and kindred products	20	7	7	7	7	7	7	7	7	7	8	8	8
Textiles and apparel	22-23	4	4	3	3	3	3	3	3	3	3	3	3
Lumber, wood products, and furniture	24-25	5	6	7	6	7	7	7	7	7	7	7	7
Paper and allied products	26	6	8	8	8	8	8	10	12	12	14	14	15
Chemicals and allied products	28	35	39	41	39	38	40	41	40	42	42	41	41
Industrial chemicals	281–82	32	34	34	33	33	34	35	36	38	38	36	36
Drugs and medicines	283	48	65	65	60	57	57	59	64	62	64	61	61
Other chemicals	284–89	31	30	31	31	29	30	29	28	28	26	27	29
Petroleum refining and extraction	29	16	17	17	16	17	18	19	17	18	20	20	21
Rubber products	30	17	17	15	16	17	17	18	18	19	18	(2)	(2)
Stone, clay, and glass products	32	10	11	11	10	10	11	11	11	12	13	13	(2)
Primary metals	33	6	6	6	6	5	5	7	8	8	8	8	8
Ferrous metals and products	331-32,3398-99	4	4	4	4	4	4	5	5	5	5	5	5
Nonferrous metals and products	333-36	9	10	9	8	9	9	11	15	14	13	14	14
Fabricated metal products	34	12	10	11	10	11	11	12	12	12	12	12	14
Machinery	35	27	28	29	31	31	34	36	38	38	39	38	37
Office, computing, and accounting machines	357	(3)	(3)	(3)	66	65	67	76	79	77	77	73	71
Electrical equipment and communication	36	42	41	38	37	37	37	40	42	41	40	41	44
Radio and TV receiving equipment	365	32	32	35	26	20	18	16	15	13	13	13	16
Electronic components	367	50	46	43	39	40	40	49	55	54	51	52	(2)
Communication equipment and communication	366,48				42	43	43	44	45	46	48	52	54
Other electrical equipment	361–64,369	33	35	32	31	31	32	36	38	34	31	30	32
Motor vehicles and motor vehicles equipment	371	19	20	22	23	22	24	25	25	24	25	25	28
Other transportation equipment	373–75,379				14	13	13	13	14	13	14	12	10
Aircraft and missiles	372,376	80	73	74	76	68	72	72	78	82	89	83	83
Professional and scientific instruments	38	34	29	33	33	34	35	38	41	42	45	45	46
Scientific and mechanical measuring instruments	381–82	28	27	31	31	33	35	41	45	45	50	49	46
Optical, surgical, photographic and other instruments	383–87	36	32	33	34	35	35	37	38	41	43	44	45
Other manufacturing industries	21,27,31,39	7	6	7	6	6	6	7	8	7	8	6	6
Nonmanufacturing industries	07–17,41–47, 49–67,737, 739,807,891	12	23	22	21	18	17	16	19	18	18	19	21

[1] The number of R&D scientists and engineers for 1980 is derived by dividing the arithmetic mean of scientists and engineers employed in January 1980 and January 1981 by the number of company employees in all activities in March 1980. Similar procedures were used in earlier years except 1969 in which data were derived by dividing the man-years of R&D scientists and engineers for the year by the March employment figures.

[2] Not separately available but included in total.

[3] Data not tabulated at this level prior to 1972.

SOURCE: National Science Foundation

TABLE 51. R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1970	1972	1973	1974	1975	1976	1977	1978 1/	1979	1980
TOTAL	2,334,859	2,630,442	2,883,958	3,022,642	3,408,616	3,727,232	4,069,847	4,621,291	5,354,438	6,049,325
SOURCE OF FUNDS:										
FEDERAL GOVERNMENT	1,647,500	1,795,045	1,985,386	2,032,204	2,288,070	2,511,603	2,729,755	3,057,158	3,594,386	4,092,569
STATE AND LOCAL GOVERNMENTS	218,777	269,582	294,572	306,881	331,612	363,017	373,213	413,588	468,976	492,310
INDUSTRY	60,538	74,413	83,968	95,953	112,952	123,134	138,788	169,605	192,745	235,511
INSTITUTIONAL FUNDS	243,051	304,789	318,289	369,689	417,391	444,972	513,559	621,871	725,063	820,940
ALL OTHER SOURCES	164,993	186,613	201,743	217,915	258,591	284,506	314,532	359,069	373,268	407,995
CHARACTER OF WORK: 2/										
BASIC RESEARCH	1,795,864	2,022,150	2,053,140	2,153,952	2,409,443	2,547,576	2,801,762	-	3,607,310	4,018,809
APPLIED RESEARCH AND DEVELOPMENT	538,995	608,292	830,818	868,690	999,173	1,179,656	1,268,085	-	1,747,128	2,030,516
FIELD:										
ENGINEERING 3/	318,836	341,362	333,129	346,905	380,912	431,727	498,473	601,062	767,799	862,600
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	-	-	-	-	48,789
CHEMICAL	-	-	-	-	-	-	-	-	-	64,474
CIVIL	-	-	-	-	-	-	-	-	-	86,602
ELECTRICAL	-	-	-	-	-	-	-	-	-	178,937
MECHANICAL	-	-	-	-	-	-	-	-	-	144,705
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	339,093
PHYSICAL SCIENCES	307,310	324,222	328,262	333,479	350,275	379,376	428,406	496,399	603,290	679,658
ASTRONOMY	18,597	21,596	24,114	24,427	26,607	26,294	32,361	36,782	39,060	52,009
CHEMISTRY	102,002	108,122	113,687	115,777	120,707	140,139	164,302	183,131	207,674	245,610
PHYSICS	161,921	159,067	167,013	169,250	173,510	183,050	201,655	235,099	300,798	329,151
OTHER, N.E.C.	24,790	35,437	23,448	24,025	29,451	29,893	30,088	41,387	55,758	52,888
ENVIRONMENTAL SCIENCES 3/	125,315	189,021	209,385	235,072	255,060	286,872	317,507	377,548	450,669	506,064
ATMOSPHERIC	-	-	-	-	-	-	-	-	-	83,077
EARTH SCIENCES	-	-	-	-	-	-	-	-	-	196,580
OCEANOGRAPHY	-	-	-	-	-	-	-	-	-	139,175
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	87,232
MATHEMATICAL/COMPUTER SCIENCES	72,413	69,322	72,741	76,709	85,306	86,994	107,868	126,178	176,012	191,940
MATHEMATICS 4/	-	-	37,084	37,507	39,713	42,491	52,305	58,756	78,424	78,408
COMPUTER SCIENCES 4/	-	-	35,657	39,202	45,593	44,503	55,563	67,422	97,588	113,532
LIFE SCIENCES	1,194,249	1,329,320	1,529,808	1,631,778	1,900,834	2,101,688	2,258,803	2,536,465	2,828,282	3,210,687
AGRICULTURAL SCIENCES 5/	-	227,079	276,870	347,514	383,841	412,867	460,647	497,662	576,436	648,591
BIOLOGICAL SCIENCES	547,193	443,473	556,676	510,210	630,163	710,717	772,287	858,882	965,876	1,082,578
MEDICAL SCIENCES	549,121	594,574	645,709	716,080	811,383	897,376	950,907	1,093,499	1,201,052	1,379,172
OTHER, N.E.C.	97,935	64,194	50,553	57,974	75,447	80,728	74,962	86,422	84,918	100,346
PSYCHOLOGY	59,250	69,188	73,742	74,236	80,322	77,883	85,129	89,664	100,389	111,019
SOCIAL SCIENCES	168,669	202,792	231,115	240,617	256,083	262,238	268,032	277,497	294,622	341,450
ECONOMICS	38,616	45,784	47,628	47,685	55,928	65,439	72,089	79,129	86,515	94,417
POLITICAL SCIENCE	19,273	21,396	25,504	27,017	29,381	28,352	32,314	36,571	40,066	49,161
SOCIOLOGY	44,383	58,451	61,514	63,447	68,749	66,239	61,922	66,900	73,529	88,361
OTHER, N.E.C.	66,397	77,161	96,469	102,468	102,025	102,208	101,707	94,897	94,512	109,511
OTHER SCIENCES, N.E.C.	88,817	105,215	105,776	83,846	99,824	100,454	105,629	116,478	133,375	145,907

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
5/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973 BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 52. R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1970	1972	1973	1974	1975	1976	1977	1978	1979	1980
TOTAL	2,286,182	2,568,573	2,809,160	2,948,761	3,334,230	3,654,035	3,990,779	4,536,539	5,264,661	5,952,023
SOURCE OF FUNDS:										
FEDERAL GOVERNMENT	1,615,276	1,754,798	1,938,225	1,985,318	2,237,153	2,464,217	2,681,092	3,003,295	3,533,236	4,029,218
STATE AND LOCAL GOVERNMENTS	214,197	261,026	282,281	294,522	325,175	355,722	364,839	405,543	460,437	483,052
INDUSTRY	58,479	73,006	81,783	93,781	110,098	120,076	135,012	165,494	189,292	230,992
INSTITUTIONAL FUNDS	237,588	297,906	310,595	362,495	409,327	436,015	502,214	609,951	712,834	807,552
ALL OTHER SOURCES	160,642	181,837	196,276	212,645	252,477	278,005	307,622	352,256	368,862	401,209
CHARACTER OF WORK: 1/										
BASIC RESEARCH	1,768,569	1,987,822	2,021,690	2,115,696	2,366,312	2,505,466	2,760,626	-	3,556,669	3,962,041
APPLIED RESEARCH AND DEVELOPMENT	517,613	580,751	787,470	833,065	967,918	1,148,569	1,230,153	-	1,707,992	1,989,982
FIELD:										
ENGINEERING 2/	311,487	335,111	328,206	343,969	377,107	425,182	490,931	591,962	760,616	856,501
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	-	-	-	-	48,279
CHEMICAL	-	-	-	-	-	-	-	-	-	64,375
CIVIL	-	-	-	-	-	-	-	-	-	84,697
ELECTRICAL	-	-	-	-	-	-	-	-	-	178,513
MECHANICAL	-	-	-	-	-	-	-	-	-	144,040
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	336,597
PHYSICAL SCIENCES	297,767	314,656	315,751	322,181	338,441	366,491	415,591	481,445	586,664	662,873
ASTRONOMY	18,356	21,373	23,853	24,185	26,394	26,094	32,117	36,505	38,570	51,355
CHEMISTRY	97,303	103,794	108,060	110,587	114,935	133,607	157,403	175,436	200,145	236,513
PHYSICS	158,182	154,640	162,189	165,323	169,310	179,013	197,861	230,678	295,450	323,963
OTHER, N.E.C.	23,926	34,849	21,649	22,086	27,802	27,777	28,210	38,826	52,499	51,042
ENVIRONMENTAL SCIENCES 2/	121,634	183,943	203,016	227,989	246,766	277,844	307,392	365,491	441,387	492,841
ATMOSPHERIC	-	-	-	-	-	-	-	-	-	80,852
EARTH SCIENCES	-	-	-	-	-	-	-	-	-	190,872
OCEANOGRAPHY	-	-	-	-	-	-	-	-	-	136,815
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	84,302
MATHEMATICAL/COMPUTER SCIENCES	70,389	67,500	70,616	74,865	82,316	84,661	104,039	121,673	171,992	187,313
MATHEMATICS 3/	-	-	35,587	36,486	37,916	41,330	51,043	57,340	77,049	76,521
COMPUTER SCIENCES 3/	-	-	35,029	38,379	44,400	43,331	52,996	64,333	94,943	110,792
LIFE SCIENCES	1,181,772	1,308,592	1,506,802	1,606,002	1,881,479	2,081,626	2,234,746	2,513,592	2,798,050	3,178,553
AGRICULTURAL SCIENCES 4/	-	225,299	274,732	335,840	377,260	406,359	453,787	490,326	565,745	636,974
BIOLOGICAL SCIENCES	537,253	435,296	547,007	500,392	619,714	700,133	758,926	843,988	950,498	1,067,902
MEDICAL SCIENCES	547,083	584,676	635,919	713,870	809,723	895,718	947,629	1,093,499	1,198,333	1,375,583
OTHER, N.E.C.	97,436	63,321	49,144	55,900	74,782	79,416	74,404	85,779	83,474	98,094
PSYCHOLOGY	56,280	65,932	70,065	70,142	74,380	74,616	82,195	86,550	93,799	106,558
SOCIAL SCIENCES	161,627	191,538	213,118	223,081	238,712	247,436	254,694	264,278	282,660	323,804
ECONOMICS	37,709	44,659	45,772	46,141	54,008	64,346	70,790	77,667	84,205	91,493
POLITICAL SCIENCE	18,362	20,575	24,311	26,315	28,108	27,084	31,144	35,280	38,917	47,032
SOCIOLOGY	43,157	52,315	52,513	55,583	62,004	62,624	59,339	64,078	70,921	83,041
OTHER, N.E.C.	62,399	73,989	90,522	95,042	94,592	93,382	93,421	87,253	88,617	102,238
OTHER SCIENCES, N.E.C.	85,226	101,301	101,586	80,532	95,029	96,179	101,191	111,548	129,493	143,580

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973 BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 53. FEDERALLY FINANCED R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1970	1972	1973	1974	1975	1976	1977	1978 1/	1979	1980
TOTAL	1,647,500	1,795,045	1,985,386	2,032,204	2,288,070	2,511,603	2,729,755	3,057,158	3,594,386	4,092,569
CHARACTER OF WORK: 2/										
BASIC RESEARCH	1,296,120	1,420,164	1,453,916	1,523,115	1,695,022	1,841,043	2,009,214	-	2,570,918	2,849,725
APPLIED RESEARCH AND DEVELOPMENT	351,380	374,881	531,470	509,089	593,048	670,560	720,541	-	1,023,468	1,242,844
FIELD:										
ENGINEERING 3/	245,888	252,876	238,139	239,346	259,353	290,518	336,725	407,487	526,366	594,547
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	-	-	-	-	37,596
CHEMICAL	-	-	-	-	-	-	-	-	-	44,938
CIVIL	-	-	-	-	-	-	-	-	-	59,105
ELECTRICAL	-	-	-	-	-	-	-	-	-	133,797
MECHANICAL	-	-	-	-	-	-	-	-	-	97,830
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	221,281
PHYSICAL SCIENCES	257,822	261,010	268,368	270,211	284,992	305,407	342,769	392,346	491,140	555,332
ASTRONOMY	15,516	16,452	17,697	17,101	19,522	18,351	23,230	26,349	26,901	37,697
CHEMISTRY	78,942	82,564	86,560	88,703	92,716	107,867	125,440	138,001	156,950	189,349
PHYSICS	144,306	136,296	145,425	146,525	149,862	156,102	171,910	199,161	261,365	286,867
OTHER, N.E.C.	19,058	25,698	18,686	17,882	22,892	23,087	22,189	28,835	45,924	41,419
ENVIRONMENTAL SCIENCES 3/	88,127	138,719	157,551	168,495	180,643	211,560	238,240	274,794	328,791	371,414
ATMOSPHERIC	-	-	-	-	-	-	-	-	-	70,693
EARTH SCIENCES	-	-	-	-	-	-	-	-	-	139,084
OCEANOGRAPHY	-	-	-	-	-	-	-	-	-	104,485
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	57,152
MATHEMATICAL/COMPUTER SCIENCES	54,338	51,938	53,685	58,107	65,099	65,807	78,178	85,344	129,662	137,997
MATHEMATICS 4/	-	-	28,756	29,396	31,224	32,882	40,632	44,130	60,470	61,080
COMPUTER SCIENCES 4/	-	-	24,929	28,711	33,875	32,925	37,546	41,214	69,192	76,917
LIFE SCIENCES	814,417	863,109	1,014,585	1,052,808	1,237,878	1,380,844	1,473,983	1,625,123	1,817,734	2,091,836
AGRICULTURAL SCIENCES 5/	-	78,313	94,373	101,417	112,864	122,538	132,772	145,070	173,005	197,821
BIOLOGICAL SCIENCES	334,851	311,997	398,628	365,701	457,093	522,170	575,128	627,151	704,341	804,331
MEDICAL SCIENCES	431,656	438,093	486,045	543,663	613,716	677,509	712,327	791,067	879,925	1,020,809
OTHER, N.E.C.	47,910	34,706	35,539	42,027	54,205	58,627	53,756	61,835	60,463	68,875
PSYCHOLOGY	47,263	53,555	58,600	58,547	61,686	59,367	63,648	63,996	72,257	81,036
SOCIAL SCIENCES	94,655	111,215	132,420	136,824	141,333	138,255	138,205	140,445	155,099	182,097
ECONOMICS	17,688	20,440	22,683	22,217	26,968	29,132	31,595	37,103	40,728	44,484
POLITICAL SCIENCE	7,920	8,387	10,363	11,894	12,280	11,966	14,926	15,888	18,452	21,127
SOCIOLOGY	26,220	34,842	40,480	41,276	45,041	41,115	37,854	40,597	46,739	57,374
OTHER, N.E.C.	42,827	47,546	58,894	61,437	57,044	56,042	53,830	46,857	49,180	59,112
OTHER SCIENCES, N.E.C.	44,990	62,623	62,038	47,866	57,086	59,845	58,007	67,623	73,337	78,310

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
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5/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973 BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 54. . FEDERALLY FINANCED R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1970	1972	1973	1974	1975	1976	1977	1978 1/	1979	1980
TOTAL	1,615,276	1,754,798	1,938,225	1,985,318	2,237,153	2,464,217	2,681,092	3,003,295	3,533,236	4,029,218
CHARACTER OF WORK: 2/										
BASIC RESEARCH...............	1,285,313	1,396,334	1,433,091	1,497,026	1,665,166	1,813,536	1,983,588	-	2,533,051	2,810,420
APPLIED RESEARCH AND DEVELOPMENT	329,963	358,464	505,134	488,292	571,987	650,681	697,504	-	1,000,185	1,218,798
FIELD:										
ENGINEERING 3/...............	209,904	210,812	234,801	237,128	256,486	286,609	332,283	402,102	520,978	589,809
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	-	-	-	-	37,093
CHEMICAL	-	-	-	-	-	-	-	-	-	44,905
CIVIL	-	-	-	-	-	-	-	-	-	57,565
ELECTRICAL	-	-	-	-	-	-	-	-	-	133,554
MECHANICAL	-	-	-	-	-	-	-	-	-	97,360
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	219,332
PHYSICAL SCIENCES	258,954	252,741	259,714	262,961	277,357	296,826	334,541	383,004	479,146	544,338
ASTRONOMY	14,509	16,256	17,479	16,901	19,338	18,208	23,028	26,120	26,421	37,131
CHEMISTRY	75,790	79,478	83,241	85,445	88,700	103,129	120,839	132,921	152,320	183,708
PHYSICS	145,635	132,692	141,658	143,559	146,800	153,078	168,987	195,776	256,845	282,805
OTHER, N.E.C.	23,020	24,315	17,336	17,056	22,519	22,411	21,687	28,187	43,560	40,694
ENVIRONMENTAL SCIENCES 3/.....	77,259	135,336	153,193	163,853	175,458	205,706	231,414	266,910	322,226	361,860
ATMOSPHERIC	-	-	-	-	-	-	-	-	-	68,586
EARTH SCIENCES	-	-	-	-	-	-	-	-	-	134,964
OCEANOGRAPHY	-	-	-	-	-	-	-	-	-	103,028
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	55,282
MATHEMATICAL/COMPUTER SCIENCES	46,869	43,630	52,591	57,016	63,327	64,638	76,407	83,412	128,131	136,279
MATHEMATICS 4/..............	-	-	27,986	28,782	30,120	32,334	39,966	43,407	59,685	59,991
COMPUTER SCIENCES 4/.......	-	-	24,605	28,234	33,207	32,304	36,441	40,005	68,446	76,288
LIFE SCIENCES	762,754	847,078	1,001,737	1,037,973	1,222,987	1,366,026	1,457,034	1,606,676	1,795,692	2,067,512
AGRICULTURAL SCIENCES 5/...	-	76,504	93,093	96,623	107,442	117,413	127,891	139,826	164,531	187,642
BIOLOGICAL SCIENCES	294,735	302,484	391,752	358,742	449,496	514,694	565,557	614,276	693,007	793,599
MEDICAL SCIENCES	414,064	433,207	482,374	542,325	612,325	676,172	710,116	791,067	878,844	1,019,093
OTHER, N.E.C.	53,955	34,883	34,518	40,283	53,724	57,747	53,470	61,507	59,310	67,178
PSYCHOLOGY	42,916	51,187	55,802	55,563	57,379	56,846	61,504	61,844	66,684	77,743
SOCIAL SCIENCES	89,392	103,028	120,375	124,745	129,998	130,671	132,864	135,205	148,942	174,850
ECONOMICS	16,856	19,701	21,814	21,182	25,558	28,560	30,870	36,237	39,274	43,228
POLITICAL SCIENCE	6,845	8,027	9,984	11,525	11,616	11,531	14,410	15,340	18,060	20,544
SOCIOLOGY	24,919	29,600	33,206	34,570	39,413	38,926	36,600	39,223	45,491	54,403
OTHER, N.E.C.	40,772	45,700	55,371	57,468	53,411	51,654	50,984	44,405	46,117	56,675
OTHER SCIENCES, N.E.C.	43,497	61,786	60,012	46,079	54,161	56,895	55,045	64,142	71,437	76,827

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA HERE NOT COLLECTED IN 1978.
3/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
5/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973 BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 55. TOTAL AND FEDERALLY FINANCED CAPITAL EXPENDITURES FOR SCIENTIFIC ACTIVITIES AT UNIVERSITIES AND COLLEGES BY SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

FIELD	1970	1972	1973	1974	1975	1976	1977	1979	1980
ALL SOURCES, TOTAL	951,873	912,487	835,862	841,560	1,016,402	1,042,420	959,626	700,642	795,207
ENGINEERING	132,623	84,950	55,800	91,701	118,299	81,661	87,715	90,595	91,883
PHYSICAL SCIENCES	225,268	137,331	106,210	93,468	80,282	73,551	65,209	64,806	77,513
ENVIRONMENTAL SCIENCES 1/....	-	27,187	26,739	24,588	35,278	49,155	28,052	24,054	34,136
MATHEMATICAL/COMPUTER SCIENCES	38,160	24,712	20,016	23,670	15,042	24,682	25,135	27,392	31,686
LIFE SCIENCES	418,472	517,941	488,705	495,078	668,715	706,888	642,473	430,325	459,556
PSYCHOLOGY	22,036	19,007	39,584	15,511	11,525	9,129	12,701	7,096	17,927
SOCIAL SCIENCES	62,049	59,993	61,215	59,329	49,659	44,020	31,742	21,033	34,971
OTHER SCIENCES, N.E.C.	53,265	41,366	37,593	38,215	37,602	53,334	66,599	35,341	47,535
FEDERAL SOURCES, TOTAL	279,316	236,836	224,651	225,681	270,082	206,758	195,462	166,425	151,628
ENGINEERING	38,263	21,082	13,547	42,702	64,019	20,200	17,219	21,929	21,440
PHYSICAL SCIENCES	63,107	27,892	24,496	20,721	18,862	19,179	21,894	32,428	22,717
ENVIRONMENTAL SCIENCES 1/....	-	8,486	5,961	7,084	5,960	6,312	9,273	8,198	7,999
MATHEMATICAL/COMPUTER SCIENCES	9,536	4,341	3,022	4,257	2,584	2,052	1,882	3,010	5,680
LIFE SCIENCES	142,718	152,328	161,907	139,775	169,458	153,570	137,369	91,471	86,859
PSYCHOLOGY	4,848	3,663	5,119	2,536	2,245	1,967	2,398	1,767	2,029
SOCIAL SCIENCES	10,303	10,939	5,369	4,467	2,755	1,806	2,086	2,075	1,548
OTHER SCIENCES, N.E.C.	10,541	8,105	5,230	4,139	4,199	1,672	3,341	5,547	3,356
OTHER SOURCES, TOTAL	672,557	675,651	611,211	615,879	746,320	835,662	764,164	534,217	643,579
ENGINEERING	94,360	63,868	42,253	48,999	54,280	61,461	70,496	68,666	70,443
PHYSICAL SCIENCES	162,161	109,439	81,714	72,747	61,420	54,372	43,315	32,378	54,796
ENVIRONMENTAL SCIENCES 1/....	-	18,701	20,778	17,504	29,318	42,843	18,779	15,856	26,137
MATHEMATICAL/COMPUTER SCIENCES	28,624	20,371	16,994	19,413	12,458	22,630	23,253	24,382	26,006
LIFE SCIENCES	275,754	365,613	326,798	355,303	499,257	553,318	505,104	338,854	372,697
PSYCHOLOGY	17,188	15,344	34,465	12,975	9,280	7,162	10,303	5,329	15,898
SOCIAL SCIENCES	51,746	49,054	55,846	54,862	46,904	42,214	29,656	18,958	33,423
OTHER SCIENCES, N.E.C.	42,724	33,261	32,363	34,076	33,403	51,662	63,258	29,794	44,179

1/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN PHYSICAL SCIENCES.
NOTE: DATA WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 56. TOTAL AND FEDERALLY FINANCED CAPITAL EXPENDITURES FOR SCIENTIFIC ACTIVITIES AT DOCTORATE-GRANTING INSTITUTIONS BY SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

FIELD	1970	1972	1973	1974	1975	1976	1977	1979	1980
ALL SOURCES, TOTAL	735,333	813,070	760,739	757,818	894,325	973,926	896,684	672,390	760,601
ENGINEERING	95,834	67,761	50,691	58,607	63,199	69,893	84,558	87,640	88,873
PHYSICAL SCIENCES	161,034	111,672	89,253	86,760	68,757	64,930	57,261	58,837	72,255
ENVIRONMENTAL SCIENCES 1/....	-	20,414	23,584	22,117	26,712	42,548	25,830	22,965	31,756
MATHEMATICAL/COMPUTER SCIENCES	26,150	18,639	18,219	21,493	11,317	18,245	21,423	23,301	25,783
LIFE SCIENCES	363,258	496,369	465,101	477,274	645,575	686,989	607,253	423,920	451,922
PSYCHOLOGY	11,971	15,570	36,662	14,063	10,206	8,112	7,930	6,246	16,949
SOCIAL SCIENCES	40,694	51,441	56,035	53,176	42,425	36,511	30,106	18,986	32,611
OTHER SCIENCES, N.E.C.	36,392	31,204	21,194	24,328	26,134	46,698	62,323	30,495	40,452
FEDERAL SOURCES, TOTAL	223,330	220,514	212,164	190,330	212,298	196,743	188,179	162,265	146,485
ENGINEERING	25,381	16,538	12,572	11,899	13,121	14,827	16,860	21,526	21,081
PHYSICAL SCIENCES	46,600	23,638	22,156	19,906	18,181	18,290	20,815	31,154	22,055
ENVIRONMENTAL SCIENCES 1/....	-	8,059	5,629	6,678	5,726	6,124	8,997	7,759	7,566
MATHEMATICAL/COMPUTER SCIENCES	6,712	3,957	2,707	3,932	1,669	1,832	1,707	2,776	3,564
LIFE SCIENCES	126,599	149,587	154,469	137,782	167,492	150,792	132,898	89,973	85,629
PSYCHOLOGY	2,845	3,163	4,587	2,474	2,092	1,809	1,668	1,569	1,873
SOCIAL SCIENCES	6,963	8,814	5,060	3,772	2,156	1,518	1,988	2,010	1,500
OTHER SCIENCES, N.E.C.	8,230	6,758	4,984	3,887	1,861	1,551	3,246	5,498	3,217
OTHER SOURCES, TOTAL	512,003	592,556	548,575	567,488	682,027	777,183	708,505	510,125	614,116
ENGINEERING	70,453	51,223	38,119	46,708	50,078	55,066	67,698	66,114	67,792
PHYSICAL SCIENCES	114,434	88,034	67,097	66,854	50,576	46,640	36,446	27,683	50,200
ENVIRONMENTAL SCIENCES 1/....	-	12,355	17,955	15,439	20,986	36,424	16,833	15,206	24,190
MATHEMATICAL/COMPUTER SCIENCES	19,438	14,682	15,512	17,561	9,648	16,413	19,716	20,525	22,219
LIFE SCIENCES	236,659	346,782	310,632	339,492	478,083	536,197	474,355	333,947	366,293
PSYCHOLOGY	9,126	12,407	32,075	11,589	8,114	6,303	6,262	4,677	15,076
SOCIAL SCIENCES	33,731	42,627	50,975	49,404	40,269	34,993	28,118	16,976	31,111
OTHER SCIENCES, N.E.C.	28,162	24,446	16,210	20,441	24,273	45,147	59,077	24,997	37,235

1/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN PHYSICAL SCIENCES.
NOTE: DATA WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 57. R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS: FISCAL YEARS 1968, 1970, AND 1972-80

(DOLLARS IN THOUSANDS)

FISCAL YEAR	ALL FFRDC'S		17 MATCHED FFRDC'S 1/	
	CURRENT DOLLARS	CONSTANT DOLLARS 2/	CURRENT DOLLARS	CONSTANT DOLLARS 2/
1968	718,930	873,548	635,674	772,386
1970	736,847	810,613	656,575	722,305
1972	753,243	753,243	687,028	687,028
1973	816,923	782,493	748,867	717,306
1974	865,098	768,976	790,649	702,799
1975	986,736	791,923	911,100	731,220
1976	1,146,712	860,895	1,066,520	800,691
1977	1,383,814	971,779	1,296,618	910,546
1978	1,716,911	1,129,547	1,712,657	1,126,748
1979	1,934,797	1,171,185	1,928,563	1,167,411
1980	2,234,809	1,264,748	2,228,090	1,260,945

1/ THESE 17 FFRDC'S WERE IN EXISTENCE THROUGHOUT THE PERIOD.
2/ BASED ON THE GNP IMPLICIT PRICE DEFLATOR IN 1972 DOLLARS.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 58. R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1970 AND 1972-80

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1970	1972	1973	1974	1975	1976	1977	1978	1979	1980
TOTAL	736,847	753,243	816,923	865,098	986,736	1,146,712	1,383,814	1,716,911	1,934,797	2,234,809
CHARACTER OF WORK: 1/										
BASIC RESEARCH	268,732	243,870	296,492	285,082	309,195	358,811	402,168	-	718,303	774,080
APPLIED RESEARCH AND DEVELOPMENT	468,115	509,373	520,431	580,016	677,541	787,901	981,646	-	1,216,494	1,460,729
FIELD:										
ENGINEERING 2/	189,060	195,393	251,539	259,080	275,682	299,683	380,420	522,213	561,083	643,669
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	-	-	-	-	24,778
CHEMICAL	-	-	-	-	-	-	-	-	-	34,183
CIVIL	-	-	-	-	-	-	-	-	-	17,852
ELECTRICAL	-	-	-	-	-	-	-	-	-	203,657
MECHANICAL	-	-	-	-	-	-	-	-	-	140,309
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	222,890
PHYSICAL SCIENCES	428,189	426,027	425,107	455,418	523,160	622,887	736,802	854,455	1,003,562	1,120,095
ASTRONOMY	19,765	28,089	28,055	29,944	31,153	32,452	41,500	38,452	46,099	59,025
CHEMISTRY	71,229	74,375	73,114	64,920	69,658	96,268	111,564	97,529	101,142	149,212
PHYSICS	317,549	305,086	318,002	268,187	322,464	376,632	447,110	568,040	584,519	823,797
OTHER, N.E.C.	19,646	18,477	5,936	92,367	99,885	117,535	136,628	150,434	271,802	88,061
ENVIRONMENTAL SCIENCES 2/	26,970	36,684	40,647	47,864	63,175	77,476	100,981	128,217	141,100	174,193
ATMOSPHERIC	-	-	-	-	-	-	-	-	-	35,577
EARTH SCIENCES	-	-	-	-	-	-	-	-	-	61,015
OCEANOGRAPHY	-	-	-	-	-	-	-	-	-	5,929
OTHER, N.E.C.	-	-	-	-	-	-	-	-	-	71,672
MATHEMATICAL/COMPUTER SCIENCES	38,213	41,174	53,178	54,339	62,416	71,641	78,584	119,203	126,850	161,540
MATHEMATICS 3/	-	-	14,744	16,002	17,715	22,063	15,358	8,100	6,614	128,054
COMPUTER SCIENCES 3/	-	-	38,434	38,337	44,701	49,578	63,226	111,103	120,236	33,486
LIFE SCIENCES	34,176	35,854	33,964	34,367	42,284	50,198	57,949	58,439	73,441	75,499
AGRICULTURAL SCIENCES 4/	-	0	35	0	0	0	354	1,206	1,551	645
BIOLOGICAL SCIENCES	26,804	28,810	24,344	26,211	31,661	38,253	43,569	48,154	62,659	56,106
MEDICAL SCIENCES	6,753	3,656	3,312	3,877	4,963	5,081	4,761	7,963	7,179	7,734
OTHER, N.E.C.	619	3,388	6,273	4,279	5,660	6,864	9,265	1,116	2,052	11,014
PSYCHOLOGY	1,506	1,428	898	850	306	92	87	103	110	135
SOCIAL SCIENCES	5,059	8,568	169	330	795	1,288	3,301	5,119	5,861	17,449
ECONOMICS	20	0	0	14	795	1,277	3,280	3,875	3,735	9,657
POLITICAL SCIENCE	220	89	0	0	0	0	0	1,244	2,126	2,422
SOCIOLOGY	102	54	169	316	0	0	0	0	0	1,500
OTHER, N.E.C.	4,717	8,425	0	0	0	11	21	0	0	3,870
OTHER SCIENCES, N.E.C.	13,674	8,115	11,421	12,850	18,918	23,447	25,690	29,162	22,790	42,229

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 59. SCIENCE/ENGINEERING POSTDOCTORATES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	16,517	16,832	18,453	19,488	18,090	18,377
ENGINEERING	1,041	1,170	1,219	1,245	1,071	979
AEROSPACE	30	43	36	46	32	20
AGRICULTURAL	19	27	32	20	25	9
BIOMEDICAL	28	40	55	73	32	28
CHEMICAL	180	213	222	211	195	189
CIVIL	82	100	106	153	123	120
ELECTRICAL	179	170	176	171	142	121
ENGINEERING SCIENCE	120	114	99	91	75	79
INDUSTRIAL	43	41	15	20	8	16
MECHANICAL	122	120	181	161	143	137
METALLURGICAL/MATERIALS	172	210	213	209	209	171
MINING	10	13	16	14	5	4
NUCLEAR	20	41	32	21	20	22
PETROLEUM	3	1	2	5	6	6
ENGINEERING, N.E.C.	33	37	34	50	56	57
PHYSICAL SCIENCES	3,848	3,932	4,033	4,196	4,020	4,245
ASTRONOMY	154	115	140	167	129	125
CHEMISTRY	2,379	2,522	2,610	2,658	2,604	2,710
PHYSICS	1,313	1,288	1,281	1,369	1,285	1,395
PHYSICAL SCIENCES, N.E.C.	2	7	2	2	2	15
ENVIRONMENTAL SCIENCES	288	292	389	376	315	307
ATMOSPHERIC SCIENCES	48	37	48	49	34	43
GEOSCIENCES	163	181	272	242	219	194
OCEANOGRAPHY	59	57	56	64	54	57
ENVIRONMENTAL SCIENCES, N.E.C.	18	17	13	21	8	13
MATHEMATICAL/COMPUTER SCIENCES	148	167	190	145	200	205
COMPUTER SCIENCE	67	55	79	75	75	62
MATHEMATICS AND APPLIED MATHEMATICS	67	85	88	54	102	122
STATISTICS	14	27	23	16	23	21
LIFE SCIENCES	10,431	10,616	11,882	12,769	11,632	11,715
AGRICULTURAL SCIENCES	266	258	331	293	215	239
BIOLOGICAL SCIENCES	5,225	5,765	6,202	6,502	6,756	6,954
ANATOMY	215	195	175	218	256	250
BIOCHEMISTRY	1,353	1,337	1,403	1,380	1,486	1,518
BIOLOGY	710	776	831	847	961	971
BIOMETRY/EPIDEMIOLOGY	24	23	37	65	68	72
BIOPHYSICS	168	206	222	221	105	149
BOTANY	157	175	179	188	163	220
CELL BIOLOGY	229	228	270	269	301	361
ECOLOGY	2	31	8	18	18	22
ENTOMOLOGY/PARASITOLOGY	131	139	123	119	104	129
GENETICS	194	199	208	209	231	251
MICROBIOLOGY	609	706	805	920	886	897
NUTRITION	98	160	170	172	170	129
PATHOLOGY	263	343	359	420	433	476
PHARMACOLOGY	412	481	557	617	633	624
PHYSIOLOGY	466	505	575	607	676	663
ZOOLOGY	151	193	201	157	180	168
BIOSCIENCES, N.E.C.	43	68	79	75	85	64
HEALTH SCIENCES	4,940	4,593	5,349	5,974	4,661	4,522
ANESTHESIOLOGY	102	95	64	75	62	54
CANCER/ONCOLOGY	73	86	120	130	110	133
CARDIOLOGY	520	484	497	502	298	334
DENTISTRY	36	31	98	360	138	102
ENDOCRINOLOGY	235	156	237	227	143	161
GASTROENTEROLOGY	195	184	168	198	103	123
HEMATOLOGY	234	197	271	248	151	148
NEUROLOGY	239	212	242	313	333	355
NURSING	0	16	1	0	7	9
OBSTETRICS/GYNECOLOGY	196	167	182	167	143	122
OPHTHALMOLOGY	92	104	163	186	138	122
OTORHINOLARYNGOLOGY	63	42	41	30	35	46
PEDIATRICS	569	472	532	514	511	427
PHARMACEUTICAL SCIENCES	182	201	202	237	235	233
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	195	88	150	112	112	161
PSYCHIATRY	272	281	283	329	294	297
PULMONARY DISEASE	161	152	207	228	143	127
RADIOLOGY	134	177	181	190	138	163
SPEECH PATHOLOGY/AUDIOLOGY	19	19	19	31	35	16
SURGERY	306	313	387	426	264	297
VETERINARY SCIENCES	51	55	75	92	26	61
CLINICAL MEDICINE, N.E.C.	1,042	1,028	1,191	1,315	1,144	922
HEALTH RELATED, N.E.C.	24	33	38	64	98	109
PSYCHOLOGY	341	367	396	399	452	473
SOCIAL SCIENCES	420	288	344	358	400	453
AGRICULTURAL ECONOMICS	52	28	30	28	6	8
ANTHROPOLOGY	26	33	45	53	41	40
ECONOMICS (EXCEPT AGRICULTURAL)	68	44	57	65	98	159
GEOGRAPHY	22	7	12	9	5	15
HISTORY AND PHILOSOPHY OF SCIENCE	6	6	12	22	11	15
LINGUISTICS	43	19	32	29	30	54
POLITICAL SCIENCE	39	18	28	27	30	32
SOCIOLOGY	105	89	114	99	118	104
SOCIOLOGY/ANTHROPOLOGY	1	1	0	0	4	2
SOCIAL SCIENCES, N.E.C.	58	43	14	26	57	24

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 60. SCIENCE/ENGINEERING POSTDOCTORATES SUPPORTED BY FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	11,683	11,914	13,056	13,328	13,461	13,604
ENGINEERING	720	815	875	932	772	689
AEROSPACE	17	24	31	39	27	19
AGRICULTURAL	5	18	15	9	11	4
BIOMEDICAL	23	28	38	47	30	24
CHEMICAL	110	119	151	159	130	122
CIVIL	53	56	78	102	80	91
ELECTRICAL	125	128	131	140	100	79
ENGINEERING SCIENCE	115	106	87	74	66	61
INDUSTRIAL	14	24	9	8	4	12
MECHANICAL	87	89	120	120	112	86
METALLURGICAL/MATERIALS	135	159	159	171	149	128
MINING	10	11	15	13	5	4
NUCLEAR	9	27	17	10	6	14
PETROLEUM	1	0	2	4	6	2
ENGINEERING, N.E.C.	16	26	22	36	46	43
PHYSICAL SCIENCES	3,051	3,114	3,266	3,417	3,317	3,580
ASTRONOMY	121	86	106	126	100	107
CHEMISTRY	1,789	1,889	2,035	2,111	2,147	2,255
PHYSICS	1,139	1,138	1,124	1,179	1,070	1,207
PHYSICAL SCIENCES, N.E.C.	2	1	1	1	0	11
ENVIRONMENTAL SCIENCES	233	222	298	307	253	252
ATMOSPHERIC SCIENCES	43	34	46	46	32	42
GEOSCIENCES	124	136	209	204	175	156
OCEANOGRAPHY	54	41	38	47	41	44
ENVIRONMENTAL SCIENCES, N.E.C.	12	11	5	10	5	10
MATHEMATICAL/COMPUTER SCIENCES	94	70	89	91	102	90
COMPUTER SCIENCE	60	41	54	65	60	51
MATHEMATICS AND APPLIED MATHEMATICS	25	17	29	21	31	34
STATISTICS	9	12	6	5	11	5
LIFE SCIENCES	7,192	7,335	8,115	8,186	8,506	8,430
AGRICULTURAL SCIENCES	153	119	191	170	128	152
BIOLOGICAL SCIENCES	3,896	4,381	4,816	4,903	5,385	5,437
ANATOMY	146	147	135	157	202	191
BIOCHEMISTRY	1,053	1,089	1,139	1,131	1,195	1,217
BIOLOGY	502	531	665	620	751	771
BIOMETRY/EPIDEMIOLOGY	14	18	29	42	54	58
BIOPHYSICS	142	177	197	200	87	123
BOTANY	97	80	93	108	104	159
CELL BIOLOGY	186	194	228	205	225	275
ECOLOGY	1	27	7	14	17	19
ENTOMOLOGY/PARASITOLOGY	89	75	85	82	78	88
GENETICS	153	154	161	163	205	187
MICROBIOLOGY	448	516	597	665	713	711
NUTRITION	69	101	102	118	130	86
PATHOLOGY	184	257	273	304	352	352
PHARMACOLOGY	318	403	449	479	520	513
PHYSIOLOGY	356	400	473	473	554	523
ZOOLOGY	123	167	150	107	145	123
BIOSCIENCES, N.E.C.	15	45	33	35	53	41
HEALTH SCIENCES	3,143	2,835	3,108	3,113	2,993	2,841
ANESTHESIOLOGY	46	37	43	33	29	29
CANCER/ONCOLOGY	64	70	95	76	97	109
CARDIOLOGY	330	289	253	236	167	194
DENTISTRY	9	11	42	61	47	51
ENDOCRINOLOGY	146	100	146	129	95	106
GASTROENTEROLOGY	136	101	86	95	41	55
HEMATOLOGY	154	140	175	161	111	103
NEUROLOGY	174	166	172	204	241	275
NURSING	0	16	1	0	6	9
OBSTETRICS/GYNECOLOGY	94	78	77	75	55	51
OPHTHALMOLOGY	50	64	108	132	93	72
OTORHINOLARYNGOLOGY	47	31	17	17	21	24
PEDIATRICS	358	289	312	242	310	224
PHARMACEUTICAL SCIENCES	156	175	169	174	194	201
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	134	71	94	74	73	121
PSYCHIATRY	213	198	169	213	244	203
PULMONARY DISEASE	92	76	103	98	82	61
RADIOLOGY	85	128	155	114	98	104
SPEECH PATHOLOGY/AUDIOLOGY	19	15	17	17	31	14
SURGERY	182	173	203	205	163	179
VETERINARY SCIENCES	36	37	40	53	15	43
CLINICAL MEDICINE, N.E.C.	608	557	608	651	709	538
HEALTH RELATED, N.E.C.	10	13	23	53	71	75
PSYCHOLOGY	187	217	253	240	280	301
SOCIAL SCIENCES	206	141	160	155	231	262
AGRICULTURAL ECONOMICS	36	21	23	7	3	6
ANTHROPOLOGY	17	19	27	24	28	31
ECONOMICS (EXCEPT AGRICULTURAL)	38	15	14	12	35	83
GEOGRAPHY	7	2	1	4	2	6
HISTORY AND PHILOSOPHY OF SCIENCE	1	1	1	6	2	5
LINGUISTICS	7	6	8	7	6	19
POLITICAL SCIENCE	10	3	11	14	16	10
SOCIOLOGY	52	53	66	71	97	87
SOCIOLOGY/ANTHROPOLOGY	0	0	0	0	4	2
SOCIAL SCIENCES, N.E.C.	38	21	9	10	38	13

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 61. SCIENCE/ENGINEERING POSTDOCTORATES SUPPORTED BY NON-FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	4,834	4,918	5,397	6,160	4,629	4,773
ENGINEERING	321	355	344	313	299	290
AEROSPACE	13	19	5	7	5	1
AGRICULTURAL	14	9	17	11	14	5
BIOMEDICAL	5	12	17	26	2	4
CHEMICAL	70	94	71	52	65	67
CIVIL	29	44	28	51	43	29
ELECTRICAL	54	42	45	31	42	42
ENGINEERING SCIENCE	5	8	12	17	9	18
INDUSTRIAL	29	17	6	12	4	4
MECHANICAL	35	31	61	41	31	51
METALLURGICAL/MATERIALS	37	51	54	38	60	43
MINING	0	2	1	1	0	0
NUCLEAR	11	14	15	11	14	8
PETROLEUM	2	1	0	1	0	4
ENGINEERING, N.E.C.	17	11	12	14	10	14
PHYSICAL SCIENCES	797	818	767	779	703	665
ASTRONOMY	33	29	34	41	29	18
CHEMISTRY	590	633	575	547	457	455
PHYSICS	174	150	157	190	215	188
PHYSICAL SCIENCES, N.E.C.	0	6	1	1	2	4
ENVIRONMENTAL SCIENCES	55	70	91	69	62	55
ATMOSPHERIC SCIENCES	5	3	2	3	2	1
GEOSCIENCES	39	45	63	38	44	38
OCEANOGRAPHY	5	16	18	17	13	13
ENVIRONMENTAL SCIENCES, N.E.C.	6	6	8	11	3	3
MATHEMATICAL/COMPUTER SCIENCES	54	97	101	54	98	115
COMPUTER SCIENCE	7	14	25	10	15	11
MATHEMATICS AND APPLIED MATHEMATICS	42	68	59	33	71	88
STATISTICS	5	15	17	11	12	16
LIFE SCIENCES	3,239	3,281	3,767	4,583	3,126	3,285
AGRICULTURAL SCIENCES	113	139	140	123	87	87
BIOLOGICAL SCIENCES	1,329	1,384	1,386	1,599	1,371	1,517
ANATOMY	69	48	40	61	54	59
BIOCHEMISTRY	300	248	264	249	291	301
BIOLOGY	208	245	166	227	210	200
BIOMETRY/EPIDEMIOLOGY	10	5	8	23	14	14
BIOPHYSICS	26	29	25	21	18	26
BOTANY	60	95	86	80	59	61
CELL BIOLOGY	43	34	42	64	76	86
ECOLOGY	1	4	1	4	1	3
ENTOMOLOGY/PARASITOLOGY	42	64	38	37	26	31
GENETICS	41	45	47	46	26	64
MICROBIOLOGY	161	190	208	255	173	186
NUTRITION	29	59	68	54	40	43
PATHOLOGY	79	86	86	116	81	124
PHARMACOLOGY	94	78	108	138	113	111
PHYSIOLOGY	110	105	102	134	122	140
ZOOLOGY	28	26	51	50	35	45
BIOSCIENCES, N.E.C.	28	23	46	40	32	23
HEALTH SCIENCES	1,797	1,758	2,241	2,861	1,668	1,681
ANESTHESIOLOGY	56	58	21	42	33	25
CANCER/ONCOLOGY	9	16	25	54	13	24
CARDIOLOGY	190	195	244	266	131	140
DENTISTRY	27	20	56	299	91	51
ENDOCRINOLOGY	89	56	91	98	48	55
GASTROENTEROLOGY	59	83	82	103	62	68
HEMATOLOGY	80	57	96	87	40	45
NEUROLOGY	65	46	70	109	92	80
NURSING	0	0	0	0	1	0
OBSTETRICS/GYNECOLOGY	102	89	105	92	88	71
OPHTHALMOLOGY	42	40	55	54	45	50
OTORHINOLARYNGOLOGY	16	11	24	13	14	22
PEDIATRICS	211	183	220	272	201	203
PHARMACEUTICAL SCIENCES	26	26	33	63	41	32
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	61	17	56	38	39	40
PSYCHIATRY	59	83	114	116	50	94
PULMONARY DISEASE	69	76	104	130	61	66
RADIOLOGY	49	49	26	76	40	59
SPEECH PATHOLOGY/AUDIOLOGY	0	4	2	14	4	2
SURGERY	124	140	184	221	101	118
VETERINARY SCIENCES	15	18	35	39	11	18
CLINICAL MEDICINE, N.E.C.	434	471	583	664	435	384
HEALTH RELATED, N.E.C.	14	20	15	11	27	34
PSYCHOLOGY	154	150	143	159	172	172
SOCIAL SCIENCES	214	147	184	203	169	191
AGRICULTURAL ECONOMICS	16	7	7	21	3	2
ANTHROPOLOGY	9	14	18	29	13	9
ECONOMICS (EXCEPT AGRICULTURAL)	30	29	43	53	63	76
GEOGRAPHY	15	5	11	5	3	9
HISTORY AND PHILOSOPHY OF SCIENCE	5	5	11	16	9	10
LINGUISTICS	36	13	24	22	24	35
POLITICAL SCIENCE	29	15	17	13	14	22
SOCIOLOGY	53	36	48	28	21	17
SOCIOLOGY/ANTHROPOLOGY	1	1	0	0	0	0
SOCIAL SCIENCES, N.E.C.	20	22	5	16	19	11

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 62. FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	39,601	40,136	42,717	43,896	48,416	50,914
ENGINEERING	11,102	11,027	11,407	11,944	12,937	14,058
AEROSPACE	534	512	484	497	503	580
AGRICULTURAL	212	302	276	314	348	364
BIOMEDICAL	174	197	191	195	205	213
CHEMICAL	1,289	1,362	1,436	1,450	1,687	1,899
CIVIL	1,836	1,723	1,867	1,974	1,939	2,118
ELECTRICAL	2,187	2,183	2,153	2,435	2,589	2,856
ENGINEERING SCIENCE	490	487	472	422	452	468
INDUSTRIAL	616	516	478	457	547	584
MECHANICAL	1,696	1,636	1,778	1,762	1,963	2,045
METALLURGICAL/MATERIALS	1,018	1,070	1,105	1,150	1,319	1,387
MINING	132	111	128	119	78	123
NUCLEAR	405	473	471	507	546	516
PETROLEUM	59	63	74	92	118	104
ENGINEERING, N.E.C.	454	392	494	570	643	801
PHYSICAL SCIENCES	6,395	6,422	6,756	6,784	7,691	8,235
ASTRONOMY	287	278	279	264	272	270
CHEMISTRY	3,111	3,233	3,521	3,597	4,085	4,541
PHYSICS	2,960	2,880	2,936	2,904	3,318	3,420
PHYSICAL SCIENCES, N.E.C.	37	31	20	19	16	4
ENVIRONMENTAL SCIENCES	2,666	2,829	3,161	3,196	3,461	3,615
ATMOSPHERIC SCIENCES	369	419	437	450	483	498
GEOSCIENCES	1,321	1,368	1,633	1,625	1,886	2,015
OCEANOGRAPHY	771	801	821	841	829	818
ENVIRONMENTAL SCIENCES, N.E.C.	205	241	270	280	263	284
MATHEMATICAL/COMPUTER SCIENCES	1,414	1,375	1,528	1,504	1,615	1,796
COMPUTER SCIENCE	747	746	782	781	861	1,071
MATHEMATICS AND APPLIED MATHEMATICS	380	366	458	417	463	441
STATISTICS	287	263	288	306	291	284
LIFE SCIENCES	10,857	11,311	12,601	13,090	15,036	15,515
AGRICULTURAL SCIENCES	3,488	3,703	3,950	4,075	4,428	4,516
BIOLOGICAL SCIENCES	6,520	6,751	7,641	7,937	9,155	9,458
ANATOMY	52	63	85	97	158	142
BIOCHEMISTRY	1,044	1,021	1,185	1,238	1,450	1,436
BIOLOGY	772	845	1,042	947	1,162	1,316
BIOMETRY/EPIDEMIOLOGY	61	62	83	89	88	117
BIOPHYSICS	141	179	185	189	194	173
BOTANY	934	1,004	1,103	1,173	1,264	1,279
CELL BIOLOGY	84	77	100	136	162	159
ECOLOGY	156	157	212	249	247	272
ENTOMOLOGY/PARASITOLOGY	610	656	661	672	819	889
GENETICS	137	138	159	165	191	235
MICROBIOLOGY	599	651	725	733	880	920
NUTRITION	850	765	881	970	1,051	1,119
PATHOLOGY	90	82	106	95	164	152
PHARMACOLOGY	231	268	277	320	382	346
PHYSIOLOGY	240	286	339	395	384	409
ZOOLOGY	497	474	474	443	478	380
BIOSCIENCES, N.E.C.	22	23	24	26	81	114
HEALTH SCIENCES	849	857	1,010	1,078	1,453	1,541
ANESTHESIOLOGY	0	0	1	0	0	0
CANCER/ONCOLOGY	16	20	10	9	10	9
CARDIOLOGY	1	1	0	0	2	6
DENTISTRY	0	13	32	14	35	34
ENDOCRINOLOGY	2	6	2	3	8	10
GASTROENTEROLOGY	1	0	0	0	0	0
HEMATOLOGY	1	0	1	4	0	1
NEUROLOGY	34	53	44	51	74	75
NURSING	22	13	10	28	75	101
OBSTETRICS/GYNECOLOGY	3	11	14	7	8	0
OPHTHALMOLOGY	10	0	0	1	0	3
OTORHINOLARYNGOLOGY	5	2	7	6	4	0
PEDIATRICS	13	7	7	3	0	0
PHARMACEUTICAL SCIENCES	197	185	223	256	392	400
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	68	109	109	97	162	185
PSYCHIATRY	14	7	11	9	29	19
PULMONARY DISEASE	3	0	0	0	0	0
RADIOLOGY	36	67	76	36	31	45
SPEECH PATHOLOGY/AUDIOLOGY	205	164	206	235	235	271
SURGERY	12	4	10	9	0	4
VETERINARY SCIENCES	125	142	177	237	212	205
CLINICAL MEDICINE, N.E.C.	33	9	19	22	37	31
HEALTH RELATED, N.E.C.	48	44	51	51	139	142
PSYCHOLOGY	2,285	2,207	2,235	2,285	2,323	2,358
SOCIAL SCIENCES	4,882	4,965	5,029	5,093	5,353	5,337
AGRICULTURAL ECONOMICS	800	889	868	952	979	962
ANTHROPOLOGY	350	378	339	392	375	349
ECONOMICS (EXCEPT AGRICULTURAL)	1,162	1,148	1,176	1,151	1,158	1,164
GEOGRAPHY	217	218	256	233	216	256
HISTORY AND PHILOSOPHY OF SCIENCE	9	2	10	12	11	14
LINGUISTICS	125	103	142	104	135	139
POLITICAL SCIENCE	788	801	785	709	887	844
SOCIOLOGY	763	753	868	813	756	745
SOCIOLOGY/ANTHROPOLOGY	96	124	75	89	90	84
SOCIAL SCIENCES, N.E.C.	572	549	510	638	746	780

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 63. FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH FEDERALLY FUNDED RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	22,307	23,077	24,420	25,179	27,841	29,095
ENGINEERING	6,781	6,967	7,277	7,614	8,083	8,562
AEROSPACE	406	385	330	366	355	375
AGRICULTURAL	54	97	80	127	114	110
BIOMEDICAL	95	113	122	104	129	110
CHEMICAL	696	811	850	866	917	1,068
CIVIL	962	911	1,034	1,055	1,136	1,253
ELECTRICAL	1,646	1,697	1,665	1,828	1,875	1,964
ENGINEERING SCIENCE	382	386	359	262	366	379
INDUSTRIAL	266	220	172	212	230	250
MECHANICAL	1,010	1,045	1,185	1,189	1,273	1,240
METALLURGICAL/MATERIALS	740	760	823	836	1,013	1,014
MINING	79	70	93	80	58	90
NUCLEAR	162	191	216	248	268	240
PETROLEUM	11	12	18	39	40	44
ENGINEERING, N.E.C.	272	269	330	402	309	425
PHYSICAL SCIENCES	5,299	5,470	5,656	5,746	6,440	6,932
ASTRONOMY	242	235	247	223	225	236
CHEMISTRY	2,388	2,664	2,827	2,883	3,285	3,733
PHYSICS	2,656	2,563	2,576	2,626	2,921	2,959
PHYSICAL SCIENCES, N.E.C.	13	8	6	14	9	4
ENVIRONMENTAL SCIENCES	1,941	2,086	2,264	2,278	2,619	2,650
ATMOSPHERIC SCIENCES	303	334	394	420	457	454
GEOSCIENCES	959	1,017	1,130	1,157	1,408	1,457
OCEANOGRAPHY	547	587	572	567	610	585
ENVIRONMENTAL SCIENCES, N.E.C.	132	148	168	134	144	154
MATHEMATICAL/COMPUTER SCIENCES	828	752	795	877	1,002	1,099
COMPUTER SCIENCE	477	452	425	511	623	721
MATHEMATICS AND APPLIED MATHEMATICS	207	203	249	225	268	259
STATISTICS	144	97	121	141	111	119
LIFE SCIENCES	5,031	5,362	6,045	6,181	7,085	7,498
AGRICULTURAL SCIENCES	1,219	1,330	1,344	1,417	1,465	1,548
BIOLOGICAL SCIENCES	3,367	3,531	4,159	4,202	4,939	5,274
ANATOMY	26	30	55	62	82	82
BIOCHEMISTRY	713	654	832	865	1,014	1,019
BIOLOGY	450	526	701	604	790	925
BIOMETRY/EPIDEMIOLOGY	37	46	53	60	53	81
BIOPHYSICS	103	133	140	143	137	117
BOTANY	310	352	401	444	499	532
CELL BIOLOGY	61	62	53	92	122	123
ECOLOGY	61	87	109	125	141	148
ENTOMOLOGY/PARASITOLOGY	234	238	245	239	215	287
GENETICS	64	87	86	80	92	127
MICROBIOLOGY	385	419	474	447	617	662
NUTRITION	328	296	348	339	395	425
PATHOLOGY	53	45	47	52	81	78
PHARMACOLOGY	122	148	146	178	197	171
PHYSIOLOGY	130	143	166	215	187	222
ZOOLOGY	282	261	296	245	286	240
BIOSCIENCES, N.E.C.	8	4	7	12	31	35
HEALTH SCIENCES	445	501	542	562	681	676
ANESTHESIOLOGY	0	0	1	0	0	0
CANCER/ONCOLOGY	16	20	10	9	10	9
CARDIOLOGY	1	1	0	0	2	3
DENTISTRY	0	5	12	5	17	9
ENDOCRINOLOGY	2	3	2	3	7	10
GASTROENTEROLOGY	1	0	0	0	0	0
HEMATOLOGY	1	0	0	0	0	0
NEUROLOGY	27	44	37	39	61	55
NURSING	13	1	1	11	36	34
OBSTETRICS/GYNECOLOGY	0	8	14	6	6	0
OPHTHALMOLOGY	5	0	0	0	0	0
OTORHINOLARYNGOLOGY	5	2	5	5	4	0
PEDIATRICS	11	6	7	2	0	0
PHARMACEUTICAL SCIENCES	112	113	155	157	181	193
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	45	58	52	51	82	92
PSYCHIATRY	7	7	9	9	29	17
PULMONARY DISEASE	1	0	0	0	0	0
RADIOLOGY	26	52	47	24	18	25
SPEECH PATHOLOGY/AUDIOLOGY	98	87	90	118	111	114
SURGERY	10	1	8	9	0	2
VETERINARY SCIENCES	29	59	51	73	68	72
CLINICAL MEDICINE, N.E.C.	19	4	11	13	14	11
HEALTH RELATED, N.E.C.	16	30	30	28	35	30
PSYCHOLOGY	1,036	1,003	962	1,020	1,140	901
SOCIAL SCIENCES	1,391	1,437	1,421	1,463	1,472	1,453
AGRICULTURAL ECONOMICS	277	310	294	373	338	364
ANTHROPOLOGY	110	156	118	114	128	105
ECONOMICS (EXCEPT AGRICULTURAL)	291	296	234	270	288	284
GEOGRAPHY	85	58	79	66	64	78
HISTORY AND PHILOSOPHY OF SCIENCE	0	0	3	5	2	1
LINGUISTICS	55	40	80	45	44	45
POLITICAL SCIENCE	89	91	102	91	107	89
SOCIOLOGY	273	288	294	293	302	318
SOCIOLOGY/ANTHROPOLOGY	29	20	18	19	20	18
SOCIAL SCIENCES, N.E.C.	182	178	199	187	179	151

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 64. FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH NONFEDERALLY FUNDED RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1974-80

FIELD	1974	1975	1976	1977	1979	1980
TOTAL, ALL FIELDS	17,294	17,059	18,297	18,717	20,575	21,819
ENGINEERING	4,321	4,060	4,130	4,330	4,854	5,496
AEROSPACE	128	127	154	131	148	205
AGRICULTURAL	158	205	196	187	234	254
BIOMEDICAL	79	84	69	91	76	103
CHEMICAL	593	551	586	584	770	831
CIVIL	874	812	833	919	803	865
ELECTRICAL	541	486	488	607	714	892
ENGINEERING SCIENCE	108	101	113	160	86	89
INDUSTRIAL	350	296	306	245	317	334
MECHANICAL	686	591	593	573	690	805
METALLURGICAL/MATERIALS	278	310	282	314	306	373
MINING	53	41	35	39	20	33
NUCLEAR	243	282	255	259	278	276
PETROLEUM	48	51	56	53	78	60
ENGINEERING, N.E.C.	182	123	164	168	334	376
PHYSICAL SCIENCES	1,096	952	1,100	1,038	1,251	1,303
ASTRONOMY	45	43	32	41	47	34
CHEMISTRY	723	569	694	714	800	808
PHYSICS	304	317	360	278	397	461
PHYSICAL SCIENCES, N.E.C.	24	23	14	5	7	0
ENVIRONMENTAL SCIENCES	725	743	897	918	842	965
ATMOSPHERIC SCIENCES	66	85	43	30	26	44
GEOSCIENCES	362	351	503	468	478	558
OCEANOGRAPHY	224	214	249	274	219	233
ENVIRONMENTAL SCIENCES, N.E.C.	73	93	102	146	119	130
MATHEMATICAL/COMPUTER SCIENCES	586	623	733	627	613	697
COMPUTER SCIENCE	270	294	357	270	238	350
MATHEMATICS AND APPLIED MATHEMATICS	173	163	209	192	195	182
STATISTICS	143	166	167	165	180	165
LIFE SCIENCES	5,826	5,949	6,556	6,909	7,951	8,017
AGRICULTURAL SCIENCES	2,269	2,373	2,606	2,658	2,963	2,968
BIOLOGICAL SCIENCES	3,153	3,220	3,482	3,735	4,216	4,184
ANATOMY	26	33	30	35	76	60
BIOCHEMISTRY	331	367	353	373	436	417
BIOLOGY	322	319	341	343	372	391
BIOMETRY/EPIDEMIOLOGY	24	16	30	29	35	36
BIOPHYSICS	38	46	45	46	57	56
BOTANY	624	652	702	729	765	747
CELL BIOLOGY	23	15	47	44	40	36
ECOLOGY	95	70	103	124	106	124
ENTOMOLOGY/PARASITOLOGY	376	418	416	433	604	602
GENETICS	73	51	73	85	99	108
MICROBIOLOGY	214	232	251	286	263	258
NUTRITION	522	469	533	631	656	694
PATHOLOGY	37	37	59	43	83	74
PHARMACOLOGY	109	120	131	142	185	175
PHYSIOLOGY	110	143	173	180	197	187
ZOOLOGY	215	213	178	198	192	140
BIOSCIENCES, N.E.C.	14	19	17	14	50	79
HEALTH SCIENCES	404	356	468	516	772	865
ANESTHESIOLOGY	0	0	0	0	0	0
CANCER/ONCOLOGY	0	0	0	0	0	0
CARDIOLOGY	0	0	0	0	0	3
DENTISTRY	0	8	20	9	18	25
ENDOCRINOLOGY	0	3	0	0	1	0
GASTROENTEROLOGY	0	0	0	0	0	0
HEMATOLOGY	0	0	1	4	0	1
NEUROLOGY	7	9	7	12	13	20
NURSING	9	12	9	17	39	67
OBSTETRICS/GYNECOLOGY	3	3	0	1	2	0
OPHTHALMOLOGY	5	0	0	1	0	3
OTORHINOLARYNGOLOGY	0	0	2	1	0	0
PEDIATRICS	2	1	0	1	0	0
PHARMACEUTICAL SCIENCES	85	72	68	99	211	207
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	23	51	57	46	80	93
PSYCHIATRY	7	0	2	0	0	2
PULMONARY DISEASE	2	0	0	0	0	0
RADIOLOGY	10	15	29	12	13	20
SPEECH PATHOLOGY/AUDIOLOGY	107	77	116	117	124	157
SURGERY	2	3	2	0	0	2
VETERINARY SCIENCES	96	83	126	164	144	133
CLINICAL MEDICINE, N.E.C.	14	5	8	9	23	20
HEALTH RELATED, N.E.C.	32	14	21	23	104	112
PSYCHOLOGY	1,249	1,204	1,273	1,265	1,183	1,457
SOCIAL SCIENCES	3,491	3,528	3,608	3,630	3,881	3,884
AGRICULTURAL ECONOMICS	523	579	574	579	641	598
ANTHROPOLOGY	240	222	221	278	247	244
ECONOMICS (EXCEPT AGRICULTURAL)	871	852	942	881	870	880
GEOGRAPHY	132	160	177	167	152	178
HISTORY AND PHILOSOPHY OF SCIENCE	9	2	7	7	9	13
LINGUISTICS	70	63	62	59	91	94
POLITICAL SCIENCE	699	710	683	618	780	755
SOCIOLOGY	490	465	574	520	454	427
SOCIOLOGY/ANTHROPOLOGY	67	104	57	70	70	66
SOCIAL SCIENCES, N.E.C.	390	371	311	451	567	629

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 65. FULL-TIME-EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED IN UNIVERSITIES AND COLLEGES: 1969 AND 1972-81

YEAR	NUMBER OF R&D FTE'S	PERCENT CHANGE FROM PRECEDING YEAR
1969	50,400	-
1972	48,900	-1.0
1973	46,900	-4.1
1974	47,972	2.3
1975	51,171	6.7
1976	52,984	3.5
1977	54,496	2.9
1978	55,965	2.7
1980	56,392	0.8
1981	57,162	1.4

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 66. FULL-TIME-EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT: 1969 AND 1981

FIELD OF EMPLOYMENT	1969	1981
TOTAL	50,400	57,162
ENGINEERS	5,654	6,783
PHYSICAL SCIENTISTS	7,830	7,133
ENVIRONMENTAL SCIENTISTS 1/	-	2,882
MATHEMATICAL AND COMPUTER SCIENTISTS	1,899	2,114
LIFE SCIENTISTS	29,274	32,856
PSYCHOLOGISTS	1,427	1,603
SOCIAL SCIENTISTS	4,316	3,792

1/ INCLUDED WITH PHYSICAL SCIENTISTS IN 1969.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 67. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1980 AND JANUARY 1981

FIELD OF EMPLOYMENT	TOTAL FTE'S		R&D FTE'S	
	1980	1981	1980	1981
TOTAL	281,335	287,290	56,392	57,162
ENGINEERS	29,113	29,741	7,020	6,783
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	1,239	1,118	395	287
CHEMICAL ENGINEERS	2,088	2,041	560	511
CIVIL ENGINEERS	4,752	4,858	728	692
ELECTRICAL ENGINEERS	6,984	7,243	1,813	1,769
MECHANICAL ENGINEERS	5,279	5,416	946	886
OTHER ENGINEERS	8,771	9,063	2,578	2,641
PHYSICAL SCIENTISTS	30,481	30,725	7,072	7,133
ASTRONOMERS	860	951	366	369
CHEMISTS	15,890	16,258	3,030	3,430
PHYSICISTS	12,018	11,767	2,931	2,587
OTHER PHYSICAL SCIENTISTS	1,715	1,750	746	746
ENVIRONMENTAL SCIENTISTS	8,972	9,138	2,712	2,882
ATMOSPHERIC SCIENTISTS	842	813	426	397
EARTH SCIENTISTS	6,038	6,041	1,179	1,243
OCEANOGRAPHERS	1,430	1,503	845	989
OTHER ENVIRONMENTAL SCIENTISTS	662	782	261	254
MATHEMATICAL AND COMPUTER SCIENTISTS	30,174	32,093	2,101	2,114
MATHEMATICIANS	23,024	23,877	1,346	1,357
COMPUTER SCIENTISTS	7,151	8,216	756	758
LIFE SCIENTISTS	117,135	119,712	32,020	32,856
AGRICULTURAL SCIENTISTS	14,849	15,044	5,677	5,736
BIOLOGICAL SCIENTISTS	41,219	42,737	12,263	12,840
MEDICAL SCIENTISTS	55,928	56,332	13,389	13,648
OTHER LIFE SCIENTISTS	5.142	5,598	691	632
PSYCHOLOGISTS	19,310	19,259	1,637	1,603
SOCIAL SCIENTISTS	46,153	46,622	3,834	3,792
ECONOMISTS	12,486	12,674	1,384	1,317
POLITICAL SCIENTISTS	9,748	9,988	583	593
SOCIOLOGISTS	12,296	12,453	799	783
OTHER SOCIAL SCIENTISTS	11,626	11,506	1,071	1,098

NOTE: FTE DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 68. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1978 - JANUARY 1981

FIELD OF EMPLOYMENT	TOTAL FTE'S				R&D FTE'S			
	1978	1979	1980	1981	1978	1979	1980	1981
TOTAL	180,714	186,545	192,573	196,175	53,365	54,433	54,735	55,325
ENGINEERS	20,053	21,115	21,826	22,121	5,672	6,967	6,874	6,642
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	779	813	1,003	876	278	317	387	277
CHEMICAL ENGINEERS	1,653	1,714	1,855	1,779	459	522	552	503
CIVIL ENGINEERS	3,337	3,325	3,380	3,395	678	716	708	671
ELECTRICAL ENGINEERS	4,139	4,591	4,902	4,986	1,261	1.763	1,769	1,730
MECHANICAL ENGINEERS	3,338	3,444	3,598	3,698	788	972	915	853
OTHER ENGINEERS	6,807	7,228	7,088	7,385	2,208	2,677	2,541	2,609
PHYSICAL SCIENTISTS	17,395	17,307	17,695	17,826	6,641	6,647	6,765	6,750
ASTRONOMERS 1/	-	705	682	729	-	313	362	365
CHEMISTS	8,652	8,331	8,363	8,761	3,050	3,025	2,848	3,201
PHYSICISTS	7,337	7,355	7,483	7,198	2,669	2,738	2,810	2,474
OTHER PHYSICAL SCIENTISTS	1,406	916	1,167	1,137	922	573	744	710
ENVIRONMENTAL SCIENTISTS	6,095	6,083	6,212	6,358	2,441	2,772	2,601	2,769
ATMOSPHERIC SCIENTISTS	768	742	731	691	430	433	423	392
EARTH SCIENTISTS	4,023	3,642	3,767	3,878	1,295	1,190	1,100	1,175
OCEANOGRAPHERS	1,304	1,487	1,281	1,352	717	1,064	827	965
OTHER ENVIRONMENTAL SCIENTISTS 1/	-	212	433	437	-	86	250	237
MATHEMATICAL AND COMPUTER SCIENTISTS	12,148	12,873	13,843	14,515	2,190	1,760	1,931	1,933
MATHEMATICIANS	9,318	9,561	9,953	10,182	1,431	1,052	1,219	1,226
COMPUTER SCIENTISTS	2,831	3,312	3,891	4,333	759	708	713	706
LIFE SCIENTISTS	91,334	95,774	99,663	101,587	30,198	31,181	31,544	32,340
AGRICULTURAL SCIENTISTS	12,299	12,771	12,801	12,918	4,339	5,384	5,553	5,620
BIOLOGICAL SCIENTISTS	28,057	28.957	29,291	30,806	11,878	11,797	11,949	12,480
MEDICAL SCIENTISTS	50,978	51,256	53,594	53,825	13,983	13,508	13,360	13,625
OTHER LIFE SCIENTISTS 1/	-	2,790	3,979	4,037	-	492	682	615
PSYCHOLOGISTS	8,918	8,594	8,807	8,921	1,815	1,445	1,485	1,455
SOCIAL SCIENTISTS	24,771	24,799	24,528	24,847	4,408	3,660	3,536	3,436
ECONOMISTS	6,886	7,022	7,127	7,196	1,530	1,325	1,320	1,246
POLITICAL SCIENTISTS	4,818	4,847	4,715	4,918	650	546	526	528
SOCIOLOGISTS	5,953	5,848	5,605	5,821	971	814	695	657
OTHER SOCIAL SCIENTISTS	7,115	7,082	7,081	6,912	1,256	975	996	1,005

1/ DATA NOT AVAILABLE PRIOR TO 1979.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

Table 69. Scientists and engineers by field, sex, and labor force status: 1976, 1978, and 1980

Field and sex	Total			Labor force			Outside labor force		
	1976	1978	1980	1976	1978	1980	1976	1978	1980
All fields	2,523,600	2,873,500	3,110,700	2,369,000	2,671,000	2,906,000	154,600	202,600	204,800
Men	2,270,600	2,556,400	2,702,600	2,148,500	2,391,600	2,537,800	122,100	164,800	164,700
Women	253,000	317,100	408,100	220,500	279,300	368,100	32,500	37,800	40,000
Physical scientists	223,600	55,100	266,900	200,700	221,400	224,400	22,900	33,700	37,500
Men	193,600	223,100	226,000	178,500	196,600	196,700	17,800	26,500	29,200
Women	27,300	35,000	35,900	22,200	24,800	27,600	5,100	7,200	8,300
Mathematical scientists	96,000	106,000	127,000	90,200	99,300	119,800	5,800	6,800	7,200
Men	79,700	87,800	101,300	76,200	83,000	96,400	3,500	4,700	4,900
Women	16,300	18,300	25,800	14,000	16,200	23,400	2,300	2,000	2,300
Computer specialists	209,500	306,800	354,900	204,100	299,600	347,500	5,400	7,100	7,400
Men	171,900	239,400	260,100	169,900	236,700	257,400	2,100	2,700	2,700
Women	37,600	67,400	94,800	34,200	62,900	90,100	3,400	4,500	4,700
Environmental scientists	70,800	89,700	102,600	66,300	82,900	94,400	4,600	6,700	8,200
Men	65,600	81,000	90,200	61,900	75,200	83,400	3,700	5,700	6,800
Women	5,300	8,700	12,500	4,300	7,700	11,000	900	1,000	1,400
Engineers	1,266,700	1,415,500	1,497,100	1,191,300	1,314,900	1,400,500	75,400	100,600	96,600
Men	1,253,800	1,394,700	1,462,300	1,179,700	1,295,000	1,367,300	74,100	99,600	95,000
Women	12,900	20,800	34,800	11,600	19,900	33,200	1,300	1,000	1,500
Life scientists	298,300	349,400	404,700	282,900	326,900	381,300	15,400	22,500	23,400
Men	242,700	280,700	314,300	234,600	268,600	301,300	8,100	12,100	13,000
Women	55,600	68,700	90,400	48,300	58,400	80,000	7,300	10,300	10,400
Psychologists	118,200	127,400	132,600	112,300	119,600	124,700	5,900	7,800	7,900
Men	77,900	81,300	79,900	75,800	78,600	76,900	2,100	2,700	3,100
Women	40,300	46,100	52,700	36,600	41,000	47,900	3,800	5,000	4,900
Social scientists	240,500	223,700	229,700	221,300	206,300	213,200	19,100	17,400	16,500
Men	182,600	168,600	168,400	172,000	157,900	158,400	10,700	10,700	10,000
Women	57,800	55,100	61,400	49,400	48,400	54,900	8,500	6,700	6,500

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 70. Scientists and engineers by field, sex, and employment status: 1976, 1978, and 1980

Field and sex	Total Employed									Unemployed, seeking		
	Total			In science/engineering			Outside science/engineering					
	1976	1978	1980	1976	1978	1980	1976	1978	1980	1976	1978	1980
All fields	2,324,500	2,643,300	2,873,700	2,103,500	2,397,500	2,560,100	221,000	245,800	313,600	44,500	27,600	32,300
Men	2,110,700	2,368,500	2,511,100	1,913,700	2,153,100	2,245,300	197,000	215,400	265,800	37,900	23,100	26,800
Women	213,900	274,800	362,600	189,800	244,400	314,800	24,100	30,400	47,800	6,600	4,500	5,500
Physical scientists	196,000	217,600	220,500	168,700	188,800	184,200	27,300	28,800	36,300	4,700	3,800	3,900
Men	174,500	193,600	193,700	152,000	170,300	162,800	22,500	23,300	30,900	4,000	3,000	3,100
Women	21,500	24,000	26,900	16,700	18,500	21,400	4,800	5,500	5,500	700	800	800
Mathematical scientists	87,800	98,500	118,700	78,000	88,600	106,600	9,800	9,900	12,100	2,400	800	1,100
Men	74,300	82,600	95,800	66,100	75,000	86,900	8,200	7,600	8,900	1,900	400	600
Women	13,500	15,800	23,000	11,900	13,700	19,700	1,600	2,100	3,300	400	400	500
Computer specialists	201,500	298,000	345,500	193,300	285,900	325,000	8,200	12,100	20,500	2,600	1,600	2,000
Men	168,300	235,300	255,600	161,000	224,200	249,700	7,300	11,100	5,900	1,600	1,400	1,800
Women	33,200	62,700	89,900	32,300	61,700	75,400	900	1,000	14,500	1,000	200	300
Environmental scientists	64,700	81,000	92,000	57,000	69,800	77,900	7,700	11,200	14,100	1,500	1,900	2,400
Men	60,500	73,400	81,300	53,800	64,000	68,900	6,700	9,400	12,400	1,400	1,800	2,100
Women	4,200	7,600	10,700	3,100	5,800	9,000	1,100	1,800	1,700	100	100	300
Engineers	1,168,400	1,303,700	1,387,000	1,076,600	1,199,300	1,238,100	91,800	104,400	148,900	22,900	11,100	13,500
Men	1,157,000	1,284,300	1,354,500	1,065,800	1,181,000	1,207,900	91,200	103,300	146,600	22,700	10,700	12,800
Women	11,400	19,400	32,600	10,800	18,300	30,100	6,000	1,100	2,500	200	400	700
Life scientists	279,000	323,100	377,100	257,700	300,800	349,300	21,300	22,300	27,800	4,000	3,800	4,300
Men	232,500	265,600	298,100	213,900	247,100	275,600	18,600	18,500	22,500	2,200	3,000	3,300
Women	46,500	57,500	79,000	43,800	53,800	73,600	2,700	3,700	5,400	1,800	800	1,000
Psychologists	109,500	118,100	123,000	99,900	104,800	108,500	9,600	13,300	14,500	2,800	1,500	1,700
Men	74,200	77,600	76,000	68,200	69,100	67,400	6,000	8,500	8,600	1,600	900	800
Women	35,400	40,400	47,000	31,700	35,700	41,100	3,700	4,700	5,900	1,200	600	900
Social scientists	217,600	203,300	209,900	172,400	159,500	170,600	45,200	43,800	39,300	3,700	3,000	3,400
Men	169,500	156,100	156,100	132,800	122,400	126,000	36,700	33,700	30,100	2,500	1,800	2,200
Women	48,100	47,300	53,700	39,500	37,000	44,600	8,600	10,300	9,100	1,200	1,100	1,200

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 71. Scientists and engineers by field, sex, and type of employer: 1976, 1978, and 1980

Field and sex	Total			Business & Industry			Educational Institutions			Federal Government			Other[1]		
	1976	1978	1980	1976	1978	1980	1976	1978	1980	1976	1978	1980	1976	1978	1980
All fields	2,324,500	2,643,300	2,873,700	1,274,900	1,565,300	1,706,800	421,900	458,400	505,700	219,200	235,200	248,400	408,500	384,400	412,900
Men	2,110,700	2,368,500	2,511,100	1,214,400	1,465,400	1,563,200	348,200	371,000	397,700	202,700	214,900	220,600	345,300	317,300	329,700
Women	213,900	274,800	362,600	60,600	99,900	143,600	73,700	87,400	108,000	16,600	20,300	27,700	63,000	67,100	83,200
Physical scientists	196,000	217,600	220,500	100,600	114,400	116,900	48,300	54,100	55,900	19,000	20,500	19,600	28,100	28,500	28,100
Men	174,500	193,600	193,700	91,100	103,300	103,900	42,000	47,200	48,400	17,400	17,900	17,000	24,200	25,200	24,200
Women	21,500	24,000	26,900	9,500	11,100	13,000	6,300	6,900	7,500	1,600	2,600	2,600	4,100	3,500	3,800
Mathematical scientists	87,800	98,500	118,700	27,800	33,100	42,000	39,400	44,400	52,200	11,300	11,300	12,600	9,300	9,600	12,000
Men	74,300	82,600	95,800	24,100	27,800	34,100	33,300	37,600	42,500	10,000	9,900	10,800	7,000	7,200	8,300
Women	13,500	15,800	23,000	3,800	5,300	7,900	6,100	6,700	9,600	1,300	1,500	1,800	2,400	2,300	3,800
Computer specialists	201,500	298,000	345,500	142,000	217,800	255,300	18,800	32,300	36,600	15,500	19,800	21,500	25,000	28,100	32,200
Men	168,300	235,300	255,600	119,100	174,100	191,200	15,900	22,600	23,900	12,900	17,000	17,300	20,400	21,700	23,100
Women	33,200	62,700	89,900	22,900	43,800	64,100	3,000	9,800	12,600	2,600	2,800	4,200	4,600	2,500	9,000
Environmental scientists	64,700	81,000	92,000	29,000	40,400	46,500	13,200	15,200	17,000	11,000	13,200	14,400	11,500	12,300	14,200
Men	60,500	73,400	81,300	27,400	36,800	41,400	11,600	13,600	14,800	10,300	12,200	13,000	11,200	10,900	12,000
Women	4,200	7,600	10,700	1,600	3,600	5,100	1,600	1,600	2,200	600	900	1,400	300	1,400	2,100
Engineers	1,168,400	1,303,700	1,387,000	845,300	1,001,400	1,070,800	52,200	57,300	64,500	93,300	99,700	101,600	177,500	145,500	150,100
Men	1,157,000	1,284,300	1,354,500	837,600	986,900	1,045,900	51,200	55,600	61,900	92,500	98,300	99,300	175,600	143,400	147,500
Women	11,400	19,400	32,600	7,700	14,500	24,900	1,000	1,700	2,600	800	1,300	2,300	1,900	1,900	2,700
Life scientists	279,000	323,100	377,100	72,300	91,300	107,000	114,200	130,500	153,200	41,700	44,500	50,400	50,900	56,900	66,600
Men	232,500	265,600	298,100	66,200	80,900	91,500	88,800	101,300	114,900	38,400	40,300	43,700	39,000	42,900	48,000
Women	46,500	57,500	79,000	6,000	10,400	15,500	25,400	29,100	38,300	3,200	4,200	6,700	11,800	13,600	18,400
Psychologists	109,500	118,100	123,000	13,700	19,600	19,300	45,300	48,400	49,000	3,300	3,000	2,800	47,200	47,000	51,800
Men	74,200	77,600	76,000	10,600	14,500	13,600	31,100	32,000	30,500	2,000	1,800	1,700	30,500	29,200	30,200
Women	35,400	40,400	47,000	3,100	5,100	5,800	14,200	16,300	18,400	1,400	1,200	1,200	16,600	17,800	21,600
Social scientists	217,600	203,300	209,900	44,200	47,300	49,000	90,500	76,300	77,400	24,200	23,200	25,500	58,600	56,400	58,000
Men	169,500	156,100	156,100	38,300	41,000	41,600	74,500	61,100	60,700	19,200	17,500	17,800	37,400	36,400	36,000
Women	48,100	47,300	53,700	5,900	6,300	7,400	16,000	15,200	16,700	5,000	5,700	7,600	21,200	20,100	22,000

[1] Includes nonprofit organizations; military; State, local, and other government; other and no report.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 72. Scientists and engineers by field, sex, and primary work activity: 1976, 1978 and 1980

Field	Total			Research			Development		
	1976	1978	1980	1976	1978	1980	1976	1978	1980
Total, all fields	2,324,500	2,643,300	2,873,700	250,400	283,700	327,000	376,600	412,200	464,400
Men	2,110,700	2,368,500	2,511,100	208,900	237,000	265,300	361,900	394,300	437,200
Women	213,900	274,800	362,600	41,400	46,800	61,800	14,700	17,800	27,200
Physical scientists	196,000	217,600	220,500	57,300	65,500	66,300	20,800	27,100	27,400
Men	174,500	193,600	193,700	49,300	56,700	57,500	19,800	25,300	25,200
Women	21,500	24,000	26,900	7,800	8,600	8,800	1,100	1,900	2,200
Mathematical scientists	87,800	98,500	118,700	10,100	10,800	12,500	5,100	5,100	6,200
Men	74,300	82,600	95,800	9,300	9,600	10,900	3,900	4,500	5,300
Women	13,500	15,800	23,000	800	1,200	1,600	1,200	600	900
Computer specialists	201,500	298,000	345,500	4,300	9,200	10,300	40,300	40,900	47,200
Men	168,300	235,300	255,600	3,600	7,500	7,900	32,300	33,300	36,500
Women	33,200	62,700	89,900	600	1,800	2,400	7,900	7,600	10,700
Environmental scientists	64,700	81,000	92,000	14,900	19,100	21,500	3,500	5,000	6,200
Men	60,500	73,400	81,300	12,800	16,900	18,700	3,400	4,700	5,700
Women	4,200	7,600	10,700	2,100	2,200	2,800	100	300	500
Engineers	1,168,400	1,303,700	1,387,000	51,000	53,500	63,800	296,100	316,900	358,400
Men	1,157,000	1,284,300	1,354,500	48,900	50,900	59,800	293,000	312,900	350,100
Women	11,400	19,400	32,600	2,100	2,500	4,000	3,100	4,100	8,300
Life scientists	279,000	323,100	377,100	76,600	91,800	113,100	8,200	11,400	13,200
Men	232,500	265,600	298,100	57,800	70,000	82,600	7,100	9,500	10,500
Women	46,500	57,500	79,000	18,900	21,800	30,500	1,100	1,900	2,700
Psychologists	109,500	118,100	123,000	10,300	10,300	12,500	700	1,900	1,700
Men	74,200	77,600	76,000	7,200	7,900	8,400	700	1,100	1,000
Women	35,400	40,400	47,000	3,000	2,400	4,000	(3)	800	800
Social scientists	217,600	203,300	209,900	26,000	23,500	27,100	1,800	3,800	4,000
Men	169,500	156,100	156,100	20,100	17,300	19,300	1,600	3,100	3,000
Women	48,100	47,300	53,700	5,800	6,100	7,700	(3)	800	1,100

Field	Management[1]			Teaching			Other[2]		
	1976	1978	1980	1976	1978	1980	1976	1978	1980
Total, all fields	606,500	655,000	648,900	229,800	242,400	265,500	861,300	1,050,000	1,167,700
Men	581,100	626,300	615,600	189,100	194,500	205,300	769,600	916,400	987,800
Women	25,400	28,700	33,300	40,700	48,000	60,200	91,700	133,600	180,100
Physical scientists	39,400	41,900	40,400	22,200	24,600	25,700	56,300	58,600	60,600
Men	37,300	39,900	38,400	20,000	21,300	22,000	48,100	50,300	50,700
Women	2,100	2,000	2,000	2,200	3,300	3,800	8,200	8,200	9,900
Mathematical scientists	16,700	17,100	17,800	31,500	35,100	40,100	24,400	30,400	42,100
Men	15,900	15,800	16,100	26,600	29,400	32,400	18,600	23,300	31,100
Women	900	1,300	1,800	4,900	5,600	7,700	5,700	7,000	10,900
Computer specialists	30,700	37,700	38,700	7,100	7,700	8,900	119,100	202,500	240,300
Men	28,400	34,100	34,400	5,500	6,200	7,000	98,400	154,300	170,000
Women	2,300	3,600	4,300	1,600	1,500	1,900	20,700	48,400	70,500
Environmental scientists	15,000	15,100	15,700	6,800	7,800	8,900	24,600	34,000	39,700
Men	14,800	14,400	14,900	6,100	7,400	8,100	23,600	29,800	33,900
Women	200	700	800	700	400	800	1,100	4,000	5,700
Engineers	356,900	392,100	386,000	27,800	29,800	31,900	436,600	511,400	578,800
Men	355,400	390,100	382,800	27,700	29,300	31,400	432,000	501,000	530,400
Women	1,500	2,000	3,200	100	400	600	4,800	10,300	16,500
Life scientists	66,500	72,100	76,300	45,000	51,300	58,500	82,600	96,600	115,900
Men	63,100	67,800	70,200	34,900	40,300	44,200	69,500	78,000	90,500
Women	3,400	4,300	6,100	10,100	11,000	14,300	13,100	18,500	25,300
Psychologists	18,700	21,300	20,200	31,900	33,900	37,200	48,000	50,700	51,500
Men	15,000	16,600	15,100	21,000	20,600	20,800	30,100	31,400	30,700
Women	3,700	4,600	5,100	10,900	13,300	16,300	17,700	19,300	20,700
Social scientists	62,700	57,700	53,800	57,500	52,300	54,300	69,700	66,000	70,800
Men	51,300	47,600	43,900	47,200	39,900	39,500	49,300	48,100	50,500
Women	11,400	10,100	9,900	10,300	12,400	14,800	20,300	17,900	20,300

[1] Includes management of research and development.

[2] Includes consulting; production/inspection; reporting, statistical work, computing; other activities and no report.

[3] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 73. Scientists and engineers by field, labor force status, and race: 1976, 1978, and 1980

Field and race	Total			Labor force			Outside labor force		
	1976	1978	1980	1976	1978	1980	1976	1978	1980
Total, all fields	2,523,600	2,873,500	3,110,700	2,369,000	2,671,000	2,906,000	154,600	202,600	204,800
White	2,415,300	2,742,000	2,959,700	2,264,000	2,545,100	2,762,600	151,300	196,900	197,100
Black	37,600	49,900	59,500	35,800	47,000	55,900	1,800	2,800	3,500
Asian	57,900	72,000	81,000	56,900	69,500	77,200	1,100	2,500	3,800
Other[1]	12,700	9,700	10,500	12,400	9,300	10,200	400	300	400
Physical scientists	223,600	255,100	261,900	200,700	221,400	224,400	22,900	33,700	37,500
White	210,600	240,200	246,400	188,200	207,500	210,700	22,400	32,700	35,700
Black	4,700	5,300	5,600	4,600	4,800	4,800	100	500	800
Asian	7,200	9,300	9,500	7,000	8,800	8,500	300	500	1,000
Other	1,100	300	400	900	200	300	200	(2)	100
Mathematical scientists	96,000	106,000	127,000	90,200	99,300	119,800	5,800	6,800	7,200
White	88,000	98,000	117,800	82,500	91,500	110,900	5,400	6,500	6,800
Black	5,100	4,800	5,000	4,800	4,600	4,800	300	200	200
Asian	2,600	2,900	3,800	2,600	2,800	3,600	100	100	200
Other	300	400	500	300	400	500	(2)	(2)	(2)
Computer specialists	209,500	306,800	354,900	204,100	299,600	347,500	5,400	7,100	7,400
White	199,300	289,700	333,200	194,100	283,000	326,300	5,300	6,700	6,900
Black	3,500	5,400	7,600	3,400	5,200	7,400	100	200	200
Asian	5,100	11,200	13,100	5,000	10,900	12,900	100	300	300
Other	1,600	500	900	1,600	500	900	(2)	(2)	(2)
Environmental scientists	70,800	89,700	102,600	66,300	82,900	94,400	4,600	6,700	8,200
White	68,700	87,700	100,500	64,200	81,200	92,500	4,600	6,500	8,000
Black	700	500	600	700	400	500	(2)	100	100
Asian	1,200	11,000	1,100	1,200	900	1,000	(2)	100	100
Other	200	500	500	200	500	500	(2)	(2)	(2)
Engineers	1,266,700	1,415,500	1,497,100	1,191,300	1,314,900	1,400,500	75,400	100,600	96,600
White	1,219,600	1,360,200	1,432,900	1,144,800	1,260,800	1,338,500	74,800	99,400	94,400
Black	11,400	14,800	18,900	11,200	14,300	18,100	200	500	900
Asian	29,500	35,300	40,000	29,100	34,700	38,800	400	600	1,200
Other	6,200	5,300	5,300	6,200	5,100	5,100	(2)	200	200
Life scientists	298,300	349,400	404,700	282,900	326,900	381,300	15,400	22,500	23,400
White	285,100	332,500	385,500	270,100	310,900	363,100	14,900	21,500	22,300
Black	4,400	6,400	7,500	4,400	6,200	7,300	(2)	200	200
Asian	7,300	9,000	9,900	7,000	8,300	9,200	300	700	700
Other	1,500	1,600	1,800	1,400	1,500	1,800	100	(2)	100
Psychologists	118,200	127,400	132,600	112,300	119,600	124,700	5,900	7,800	7,900
White	113,700	122,900	128,100	107,800	115,400	120,400	5,900	7,600	7,700
Black	3,100	3,600	3,600	3,100	3,400	3,300	(2)	200	200
Asian	500	400	600	500	400	600	(2)	(2)	(2)
Other	900	400	300	900	400	300	(2)	(2)	(2)
Social scientists	240,500	223,700	229,700	221,300	206,300	213,200	19,100	17,400	16,500
White	230,200	210,900	215,300	212,200	194,800	200,000	18,000	16,100	15,300
Black	4,700	9,100	10,600	3,600	8,100	9,800	1,100	1,000	800
Asian	4,500	3,000	2,900	4,500	2,700	2,600	(2)	200	300
Other	1,000	800	900	1,000	700	800	(2)	100	100

[1] Includes American Indians, other and no report.

[2] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 74. Scientists and engineers by field, employment status, and race: 1976, 1978, and 1980

Field and race	Total Employed			Employed in S/E			Employed in non-S/E			Unemployed, seeking employment		
	1976	1978	1980	1976	1978	1980	1976	1978	1980	1976	1978	1980
Total, all fields	2,324,500	2,643,300	2,873,700	2,103,500	2,397,500	2,560,100	221,000	245,800	313,600	44,500	27,600	32,300
White	2,222,100	2,519,000	2,732,800	2,009,200	2,283,200	2,432,600	212,900	235,800	300,200	41,900	26,100	29,800
Black	34,400	46,600	54,700	30,500	41,000	47,500	3,900	5,600	7,200	1,400	400	1,200
Asian	56,200	68,400	75,900	53,200	65,200	71,200	3,000	3,200	4,700	700	1,100	1,300
Other	11,900	9,300	10,200	10,600	8,100	8,800	1,300	1,200	1,400	500	(2)	(2)
Physical scientists	196,000	217,600	220,500	168,700	188,800	184,200	27,300	28,800	36,300	4,700	3,800	3,900
White	183,900	204,000	207,100	158,300	177,000	172,800	25,600	27,000	34,300	4,300	3,500	3,600
Black	4,400	4,700	4,700	3,600	3,700	3,600	800	1,000	1,100	200	100	100
Asian	6,700	8,600	8,300	6,100	7,900	7,600	600	700	700	300	200	200
Other	900	200	300	800	100	200	100	100	100	(2)	(2)	(2)
Mathematical scientists	87,800	98,500	118,700	78,000	88,600	108,600	9,800	9,900	[illegible]	2,400	800	1,100
White	80,100	90,700	109,800	70,800	81,800	98,700	9,300	8,900	[illegible]	2,400	800	1,100
Black	4,800	4,600	4,800	4,300	3,700	3,800	500	900	1,000	(2)	(2)	(2)
Asian	2,600	2,800	3,600	2,600	2,800	3,600	(2)	(2)	(2)	(2)	(2)	(2)
Other	300	400	500	300	400	500	(2)	(2)	(2)	(2)	(2)	(2)
Computer specialists	201,500	298,000	345,500	193,300	285,900	325,000	8,200	12,100	20,500	2,600	1,600	2,000
White	192,100	281,800	324,900	184,500	270,200	305,500	7,600	11,600	19,400	2,000	1,200	1,400
Black	2,800	5,200	7,200	2,500	5,100	6,600	300	100	600	600	(2)	200
Asian	5,000	10,500	12,500	4,800	10,200	12,100	200	300	400	(2)	400	400
Other	1,600	500	900	1,500	500	800	100	(2)	100	(2)	(2)	(2)
Environmental scientists	64,700	81,000	92,000	57,000	69,800	77,900	7,700	11,200	14,100	1,500	1,900	2,400
White	62,800	79,300	90,100	55,200	68,400	76,300	7,600	10,900	13,800	1,400	1,900	2,400
Black	600	400	500	400	400	400	200	(2)	100	100	(2)	(2)
Asian	1,100	800	900	1,100	800	700	(2)	200	200	100	100	100
Other	200	500	500	200	500	400	(2)	(2)	100	(2)	(2)	(2)
Engineers	1,168,400	1,303,700	1,387,000	1,076,600	1,199,300	1,238,100	91,800	104,400	148,900	22,900	11,100	13,500
White	1,123,000	1,249,900	1,325,600	1,034,500	1,148,300	1,181,200	88,500	101,600	144,400	21,800	10,900	12,900
Black	10,800	14,300	18,000	9,700	13,700	16,800	1,100	600	1,200	400	(2)	100
Asian	28,900	34,500	38,400	27,300	32,900	35,800	1,600	1,600	2,600	200	200	400
Other	5,800	5,100	5,100	5,100	4,400	4,200	700	700	900	400	(2)	(2)
Life scientists	279,000	323,100	377,100	257,700	300,800	349,300	21,300	22,300	27,800	4,000	3,800	4,300
White	266,200	307,100	356,900	245,400	285,700	332,300	20,800	21,400	26,600	3,900	3,800	4,200
Black	4,400	6,200	7,300	4,200	5,600	6,500	200	600	800	(2)	(2)	(2)
Asian	6,900	8,200	9,100	6,900	8,100	8,700	(2)	100	400	100	100	100
Other	1,400	1,500	1,800	1,200	1,500	1,500	200	(2)	100	(2)	(2)	(2)
Psychologists	109,500	118,100	123,000	99,900	104,800	108,500	9,600	13,300	14,500	2,800	1,500	1,700
White	105,200	114,100	119,000	96,000	101,200	105,000	9,200	12,900	14,000	2,600	1,300	1,400
Black	3,100	3,200	3,000	3,000	3,100	2,800	100	100	200	(2)	200	300
Asian	500	400	600	400	400	500	100	(2)	100	(2)	(2)	(2)
Other	700	400	300	500	200	100	200	200	200	200	(2)	(2)
Social scientists	217,600	203,300	209,900	172,400	159,500	170,600	45,200	43,800	39,300	3,700	3,000	3,400
White	208,600	192,100	197,200	164,400	150,700	160,800	44,200	41,400	36,400	3,600	2,700	2,800
Black	3,500	7,900	9,400	2,900	5,800	6,900	600	2,100	2,500	100	200	400
Asian	4,500	2,600	2,500	4,000	2,400	2,200	500	200	300	(2)	100	100
Other	1,000	700	800	1,000	600	700	(2)	100	100	(2)	(2)	(2)

[1] Includes American Indians, other and no report.

[2] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 75. Selected characteristics of employed doctoral scientists and engineers in the United States: 1973, 1975, 1977, and 1979

Characteristics	1973			1975			1977			1979		
	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary
Total	220,410	100.00	$20,700	256,048	100.00	$23,200	284,237	100.0	$25,800	313,736	100.0	$29,100
Field:												
Physical scientists	48,466	22.0	21,000	54,636	21.3	23,900	57,450	20.2	26,600	60,170	19.2	30,300
Chemists	30,704	13.9	21,000	35,812	14.0	24,000	37,314	13.1	26,600	39,569	12.6	30,400
Physicists/astronomers	17,762	8.1	21,000	18,826	7.4	23,700	20,136	7.1	26,500	20,601	6.6	30,100
Mathematical scientists	12,145	5.5	19,200	13,639	5.3	21,200	14,573	5.1	23,300	15,297	4.9	26,300
Mathematicians	10,686	4.8	19,000	11,898	4.6	20,900	12,860	4.5	23,100	12,930	4.1	26,100
Statisticians	1,459	.7	20,900	1,741	.7	23,100	1,713	.6	25,100	2,367	.8	29,300
Computer specialists	2,692	1.2	21,700	3,496	1.4	23,500	5,767	2.0	25,800	6,139	2.1	28,500
Environmental scientists	10,329	4.7	20,700	12,126	4.7	23,500	13,026	4.6	25,800	14,609	4.7	30,300
Earth scientists	8,534	3.9	20,700	9,531	3.7	23,600	9,765	3.4	25,900	11,144	3.6	30,300
Oceanographers	1,157	.5	19,800	1,277	.5	22,200	1,563	.5	24,100	1,662	.6	28,800
Atmospheric scientists	638	.3	22,500	1,318	.5	24,200	1,698	.6	28,300	1,803	.6	31,300
Engineers	35,775	16.2	22,300	42,410	16.6	25,200	45,046	15.8	28,600	50,222	16.0	33,100
Life scientists	58,047	26.3	20,100	65,184	25.5	22,300	71,924	25.3	24,700	80,090	25.5	28,100
Biological scientists	36,859	16.7	19,400	39,076	15.3	21,300	42,161	14.8	23,800	45,746	14.6	26,500
Agricultural scientists	10,553	4.8	19,900	12,924	5.0	22,100	14,293	5.0	24,800	15,061	4.8	29,000
Medical scientists	10,635	4.8	22,700	13,184	5.1	25,700	15,470	5.4	28,000	19,283	6.1	30,900
Psychologists	24,850	11.3	20,200	30,073	11.7	22,100	33,724	11.9	24,100	37,987	12.1	26,700
Social scientists	28,106	12.8	20,300	34,482	13.5	22,100	42,727	15.0	24,100	48,622	15.5	26,200
Economists	8,289	3.8	22,300	9,888	3.9	24,500	10,790	3.8	27,000	11,718	3.7	31,000
Sociologists/anthropologists	6,530	3.0	19,300	7,930	3.1	20,700	9,493	3.3	22,200	10,224	3.3	23,900
Other social scientists	13,287	6.0	19,500	16,664	6.5	21,100	22,444	7.9	23,200	26,680	8.5	25,300
Sex:												
Men	203,452	92.3	21,000	233,935	91.4	23,500	256,735	90.3	26,000	280,393	89.4	29,900
Women	16,958	7.7	17,400	22,113	8.6	19,000	27,502	9.7	20,700	33,343	10.6	23,100
Race:												
White	200,691	91.1	21,000	229,322	89.6	23,200	253,309	89.1	25,700	276,872	88.2	29,200
Black	2,034	.9	21,200	2,474	1.0	22,800	2,744	1.0	23,800	3,420	1.1	26,600
Am. Indian	340	.2	(1)	435	.2	20,800	597	.2	23,900	926	.3	25,800
Asian	8,989	4.1	20,000	12,577	4.9	21,500	15,242	5.4	23,800	21,031	6.7	28,200
No report	8,356	3.8	20,800	11,240	4.4	23,100	12,345	4.3	25,700	11,487	3.7	29,800
Age:												
Under 30	9,669	4.4	15,400	9,528	3.7	16,900	8,474	3.0	18,500	7,476	2.4	21,300
30-34	49,726	22.6	17,300	55,217	21.6	18,800	53,562	18.8	20,400	52,703	16.8	22,800
35-39	42,064	19.1	19,600	53,516	20.9	21,500	66,741	23.5	23,600	75,887	24.2	26,600
40-44	35,304	16.0	21,800	40,044	15.6	24,200	45,147	15.9	26,500	54,296	17.3	30,200
45-49	29,945	13.6	24,100	33,640	13.1	26,200	37,626	13.2	29,200	39,860	12.7	32,000
50-54	24,109	10.9	24,900	28,675	11.2	28,100	30,935	10.9	30,900	33,104	10.6	34,100
55-59	15,579	7.1	25,200	18,435	7.2	28,200	22,507	7.9	31,600	26,501	8.4	36,100
60-64	8,982	4.1	25,500	11,255	4.4	28,500	12,944	4.6	31,400	15,438	4.9	36,000
65 & over	4,876	2.2	24,700	5,476	2.1	(2)	5,974	2.1	31,200	7,951	2.5	35,700
No report	151	.1	24,300	262	.1	24,200	327	.1	26,600	520	.2	23,100
Sector of employment:												
Business & industry	53,403	24.2	23,300	64,630	25.2	26,000	71,464	25.1	29,900	82,824	26.4	33,800
Educational institutions	129,408	58.7	19,100	149,184	58.3	21,400	163,101	57.4	23,700	173,966	55.4	26,400
4 year coll./univ.	124,901	56.7	19,200	143,701	56.1	21,500	156,432	55.0	23,800	166,985	53.2	26,400
2 year college	2,962	1.3	17,800	3,567	1.4	19,100	4,634	1.6	20,900	4,512	1.4	24,600
Elem./sec. school	1,545	.7	19,300	1,916	.7	20,500	2,015	.7	22,400	2,496	.8	25,800
Hospital/clinic	4,543	2.1	19,400	7,469	2.9	21,800	8,587	3.0	23,600	9,706	3.1	26,200
Nonprofit organizations	8,006	3.6	21,700	8,337	3.3	24,400	10,188	3.6	26,800	12,549	4.0	26,200
Federal Government	18,200	8.3	23,500	18,995	7.4	26,300	21,353	7.5	28,700	23,923	7.6	30,300
Military/Commissioned Corps	1,977	.9	(2)	2,130	.8	(2)	2,282	.8	(2)	2,304	.7	33,400
State government	3,001	1.4	19,500	3,015	1.2	20,900	3,783	1.3	21,600	4,175	1.3	(1)
Other government	1,255	.6	19,000	1,880	.7	22,900	1,545	.5	22,100	1,943	.6	23,500
Other	331	.2	21,100	82	(3)	(1)	584	.2	37,500	945	.3	23,000
No report	286	.1	(1)	328	.1	(1)	1,350	.5	(1)	1,401	.4	42,700
Primary work activity:												
Research and development	97,683	44.3	21,700	111,029	43.4	24,600	124,193	43.7	27,300	142,743	45.5	30,900
Basic research	34,258	15.5	19,900	38,144	14.9	22,200	43,545	15.3	24,600	47,864	15.3	27,700
Applied research	28,700	13.0	21,000	32,885	12.8	23,300	36,413	12.8	26,300	36,842	11.7	30,000
Development	8,502	3.9	21,100	11,331	4.4	23,600	13,502	4.8	26,100	14,995	4.8	30,800
R&D Management[4]	26,223	11.9	27,000	28,669	11.2	30,100	30,733	10.8	33,100	43,042	13.7	35,900
Management or administration	19,949	9.1	25,700	23,109	9.0	28,600	29,731	10.5	30,600	29,182	9.3	32,400
Teaching	80,012	36.3	18,900	91,159	35.6	20,600	90,392	31.8	22,600	91,922	29.3	25,200
Consulting	4,055	1.8	23,200	5,516	2.2	25,400	6,141	2.2	28,200	8,998	2.9	31,300
Sales/professional services	8,064	3.7	20,700	11,672	4.6	21,900	15,183	5.3	24,700	21,049	6.7	29,000
Other	6,959	3.2	(2)	7,485	2.9	22,100	12,785	4.5	24,900	15,679	5.0	24,900
No report	3,686	1.7	21,400	6,078	2.4	23,700	5,812	2.0	25,400	4,163	1.3	29,900

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[1] No median computed for groups with fewer than 20 individuals reporting salary.

[2] Data not available.

[3] Less than 0.5 percent.

[4] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salaries computed for full-time employed civilians only.

SOURCE: National Science Foundation

Table 76. Employed doctoral scientists and engineers by field and type of employer: 1973, 1975, 1977, and 1979

Field	Educational institutions				Business and industry				Federal Government			
	1973	1975	1977	1979	1973	1975	1977	1979	1973	1975	1977	1979
Total, all fields	129,400	149,200	163,100	174,000	53,400	64,600	71,500	82,800	18,200	19,000	21,400	23,900
Physical scientists	22,000	25,700	27,100	27,200	19,700	22,100	23,000	25,000	4,100	3,700	3,900	4,600
Mathematical scientists	10,500	11,700	12,200	12,600	900	1,100	1,300	1,400	500	600	600	800
Computer specialists	1,400	1,700	2,100	2,500	1,000	1,400	3,100	3,700	100	200	300	300
Environmental scientists	5,200	6,000	6,300	6,200	2,200	2,900	3,100	4,200	2,000	2,200	2,400	2,700
Engineers	13,000	14,900	15,900	17,000	17,800	22,100	22,900	4,200	2,700	3,000	3,500	3,600
Life scientists	39,200	43,800	47,500	52,300	7,200	8,800	10,100	11,500	6,100	6,300	6,800	7,500
Psychologists	15,100	17,700	18,600	19,900	3,100	4,100	5,500	7,100	1,200	1,000	1,200	1,100
Social scientists	23,300	27,700	33,400	36,300	1,600	2,100	2,600	3,500	1,500	2,000	2,600	3,300
						Percent distribution						
Total, all fields	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Physical scientists	17.0	17.2	16.6	15.6	36.8	34.2	32.2	30.2	22.5	19.7	18.5	19.2
Mathematical scientists	8.1	7.9	7.5	7.2	1.6	1.6	1.8	1.7	2.7	2.9	2.8	3.3
Computer specialists	1.1	1.1	1.3	1.4	1.9	2.2	4.3	4.5	.7	1.0	1.2	1.3
Environmental scientists	4.0	4.0	3.9	3.6	4.1	4.5	4.3	5.1	10.8	11.6	11.5	11.3
Engineers	10.1	10.0	9.8	9.8	33.3	34.2	32.0	31.9	15.0	15.9	16.5	15.1
Life scientists	30.3	29.4	29.1	30.1	13.6	13.7	14.1	13.9	33.6	33.1	31.7	31.4
Psychologists	11.7	11.9	11.4	11.4	5.8	6.4	7.7	8.6	6.8	5.1	5.8	4.6
Social scientists	17.8	18.6	20.5	20.9	3.0	3.2	3.6	4.2	8.0	10.6	12.4	13.8

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 77. Doctoral scientists and engineers by primary work activity and type of employer: 1973, 1975, 1977, and 1979

Primary work activity	Educational institutions				Business and industry				Federal Government			
	1973	1975	1977	1979	1973	1975	1977	1979	1973	1975	1977	1979
Total	129,400	149,200	163,100	174,000	53,400	64,600	71,500	82,800	18,200	19,000	21,400	23,900
Research and development	35,200	40,700	48,700	55,100	38,000	44,400	47,200	54,600	14,500	15,100	16,200	18,800
Basic research	22,500	25,300	30,000	33,200	3,500	4,300	4,600	4,700	4,700	4,700	4,700	5,400
Applied research	7,600	9,600	11,100	12,500	13,200	15,100	16,500	14,300	4,800	5,000	5,200	5,700
Development	600	700	1,500	1,100	7,000	9,400	10,200	11,800	500	700	900	1,100
Management of R&D	4,500	5,100	6,100	8,300	14,200	5,700	15,900	23,800	4,500	4,700	5,400	6,700
Management/administration	9,100	10,300	13,900	18,200	5,600	6,900	8,000	4,100	1,700	1,400	2,200	1,700
Other than R&D	6,200	6,800	10,100		3,500	4,700	6,100		1,000	900	1,500	
Of both[1]	2,900	3,500	3,800		2,100	2,200	1,900		700	500	700	
Teaching	78,600	90,300	89,300	90,900	200	200	200	200	100	200		
Other[2]	6,100	7,800	11,200	9,800	9,600	13,000	15,900	23,900	1,700	2,300	2,700	3,200
						Percent Distribution						
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Research and development	27.2	27.2	29.9	31.7	71.2	68.7	66.0	65.9	79.7	79.5	75.7	78.7
Basic research	17.4	17.0	18.4	19.1	6.6	6.6	6.5	5.7	26.0	24.6	22.1	22.6
Applied research	5.9	6.4	6.8	7.2	24.7	23.4	23.1	17.3	26.4	26.6	24.4	23.8
Development	.5	.5	.9	6.3	13.1	14.5	14.2	14.3	2.6	3.5	4.3	4.6
Management of R&D	3.5	3.4	3.8	4.8	26.7	24.3	22.3	28.7	24.7	24.8	25.3	28.0
Management/administration	7.0	6.9	8.5	10.5	10.5	10.8	11.2	5.0	9.3	9.4	10.6	7.1
Other than R&D	4.8	4.6	6.2		6.5	7.3	8.6		5.7	4.6	7.2	
Of both	2.2	2.3	2.3		4.0	3.5	2.6		3.6	2.8	3.4	
Teaching	61.0	60.6	54.7	52.2	.4	.3	.3	2.4	1.4	.7	.7	8.4
Other	4.7	5.3	6.8	5.6	18.0	20.2	22.3	28.9	9.6	12.3	12.6	13.4

[1] The classification of Management or Administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

[2] Includes consulting, sales/professional services, other, and no report.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 78. Selected characteristics of employed women doctoral scientists and engineers in the United States: 1973, 1975, 1977, and 1979

Characteristics	1973				1975				1977				1979			
	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary
Total	16,958	100.0	7.7	$17,400	22,113	100.0	8.6	$19,000	27,502	100.0	9.7	$20,700	33,343	100.0	10.6	$23,100
Field:																
Physical scientists	1,897	11.2	3.9	17,400	2,521	11.4	4.6	19,100	2,908	10.6	5.1	21,200	3,123	9.4	5.2	24,400
Chemists	1,461	8.6	4.8	17,300	2,046	9.3	5.7	19,000	2,354	8.6	6.3	20,900	2,546	7.6	6.4	24,200
Physicists/astronomers	436	2.6	2.5	17,700	475	2.1	2.5	19,300	554	2.0	2.8	23,100	577	1.7	2.8	25,400
Mathematical scientists	775	4.6	6.4	17,100	907	4.1	6.7	18,300	1,048	3.8	7.2	19,900	1,136	3.4	7.4	21,700
Mathematicians	701	4.1	6.6	16,800	822	3.7	6.9	18,100	934	3.4	7.3	19,900	977	2.9	7.6	21,800
Statisticians	74	.4	5.1	19,500	85	.4	4.9	22,100	114	.4	6.7	19,800	161	.5	6.8	21,600
Computer specialists	88	.5	3.3	17,700	147	.7	4.2	18,000	233	.8	4.0	20,800	366	1.1	5.4	22,800
Environmental scientists	262	1.5	2.5	17,000	325	1.5	2.7	19,000	439	1.6	3.4	19,700	607	1.8	4.2	23,500
Earth scientists	205	1.2	2.4	16,700	242	1.1	2.5	18,200	293	1.1	3.0	20,000	410	1.2	3.7	25,300
Oceanographers	37	.2	3.2	(1)	51	.2	4.0	(1)	75	.3	4.8	19,200	152	.5	9.1	21,500
Atmospheric scientists	20	.1	3.1	(1)	32	.1	2.4	(1)	71	.3	4.2	19,200	45	.1	2.5	(1)
Engineers	139	.8	.4	19,600	235	1.1	.6	20,800	283	1.0	.6	22,900	527	1.6	1.0	26,600
Life scientists	6,120	36.1	10.5	17,300	7,534	34.1	11.6	18,900	8,983	32.7	12.5	21,000	11,142	33.4	13.9	23,000
Biological scientists	4,896	28.9	13.3	17,100	5,797	26.2	14.8	18,400	6,684	24.3	15.9	20,500	7,882	23.6	17.2	22,200
Agricultural scientists	131	.8	1.2	(1)	167	.8	1.3	20,000	264	1.0	1.6	20,200	320	1.0	2.1	21,600
Medical scientists	1,093	6.4	10.3	18,300	1,570	7.1	11.9	20,600	2,035	7.4	13.2	22,800	2,940	8.8	15.2	25,300
Psychologists	4,782	28.2	19.2	18,200	6,349	28.7	21.1	19,600	7,645	27.8	22.7	20,600	9,216	27.6	24.3	23,200
Social scientists	2,895	17.1	10.3	17,600	4,095	18.5	11.9	18,700	5,963	21.7	14.0	20,200	7,224	21.7	14.9	22,600
Economists	476	2.8	5.7	19,300	614	2.8	6.2	21,400	788	2.9	7.3	23,600	977	2.9	8.3	26,900
Sociologists/anthropologists	1,227	7.2	18.8	17,100	1,675	7.6	21.1	18,500	2,286	8.3	24.1	19,700	2,558	7.7	25.0	22,100
Other social scientists	1,192	7.0	9.0	17,400	1,806	8.2	10.8	18,200	2,889	10.5	12.9	19,800	3,689	11.1	13.8	22,300
Age:																
Under 30	1,026	6.1	10.6	14,400	1,534	6.9	16.1	15,900	1,640	6.0	19.4	17,400	1,464	4.4	19.6	18,700
30-34	3,546	20.9	7.1	14,900	4,970	22.5	9.0	16,800	6,621	24.1	12.4	18,400	8,450	25.3	16.0	20,600
35-39	2,767	16.3	6.6	16,600	4,082	18.5	7.6	18,300	5,641	20.5	8.5	20,000	7,440	22.3	9.8	22,400
40-44	2,445	14.4	6.9	17,900	2,810	12.7	7.0	19,900	3,479	12.6	7.7	21,700	4,740	14.2	8.7	24,600
45-49	2,488	14.7	8.3	18,700	2,917	13.2	8.7	21,300	3,291	12.0	8.7	23,100	3,345	10.0	8.4	25,500
50-54	1,845	10.9	7.7	19,500	2,407	10.9	8.4	22,300	2,887	10.5	9.3	24,700	3,147	9.4	9.5	26,700
55-59	1,379	8.1	8.9	20,200	1,467	6.6	8.0	21,600	1,876	6.8	8.3	24,200	2,307	6.9	8.7	28,700
60-64	847	5.0	9.4	20,500	1,160	5.2	10.3	22,700	1,233	4.5	9.5	25,000	1,392	4.2	9.0	29,200
65 & over	570	3.4	11.7	19,800	703	3.2	12.8	22,400	726	2.6	12.2	25,100	913	2.7	11.5	29,700
No report	45	.3	28.8	(1)	63	.3	24.0	(1)	108	.4	33.0	(1)	145	.4	27.9	(1)
Sector of employment:																
Business & industry	1,363	8.0	2.6	19,700	2,141	9.7	3.3	22,200	2,959	10.8	4.1	24,400	4,578	13.7	5.5	27,600
Educational institutions	12,160	71.7	9.4	17,100	15,536	70.3	10.4	18,400	18,773	68.3	11.5	20,000	21,894	65.7	12.6	22,300
4-year coll./univ.	11,128	65.6	8.9	17,100	14,236	64.4	9.9	18,400	17,144	62.3	11.0	20,000	20,073	60.2	12.0	22,200
2-year college	549	3.2	18.5	17,000	701	3.2	19.7	18,700	927	3.4	20.0	19,700	898	2.7	19.9	23,800
Elem./sec. school	483	2.8	31.3	19,900	599	2.7	31.3	20,700	702	2.6	34.8	21,000	923	2.8	37.0	24,300
Hospital/clinic	967	5.7	21.3	17,500	1,745	7.9	23.4	19,400	1,958	7.1	22.8	21,000	1,928	5.8	19.9	22,800
Nonprofit organization	783	4.6	9.8	17,900	917	4.1	11.0	19,600	1,445	5.3	14.2	21,100	1,857	5.6	14.8	23,200
Federal Government	971	5.7	5.3	22,100	1,033	4.7	5.4	24,700	1,273	4.6	6.0	26,600	1,621	4.9	6.8	28,000
Military/Comm. Corps	19	.1	1.0	(1)	39	.2	1.8	(1)	47	.2	2.1	(1)	52	.2	2.3	(1)
State government	386	2.3	12.9	19,000	393	1.8	13.0	19,700	495	1.8	13.1	19,500	772	2.3	18.5	20,400
Other government	186	1.1	15.0	17,300	235	1.1	12.5	19,900	345	1.3	22.3	21,700	397	1.2	20.4	24,200
Other	74	.4	22.4	19,700	15	.1	18.3	(1)	23	.1	3.9	(1)	51	.2	5.4	(1)
No report	47	.3	16.4	18,500	59	.3	18.1	(1)	184	.7	13.6	(1)	193	.6	13.8	(1)
Primary work activity:																
Research and development	5,358	31.6	5.5	17,900	6,891	31.2	6.2	19,800	8,828	32.1	7.1	21,700	11,408	34.2	8.0	24,100
Basic research	3,500	20.6	10.2	16,800	4,450	20.1	11.7	18,400	5,434	19.8	12.5	20,600	6,404	19.2	13.4	22,200
Applied research	1,004	5.9	3.5	19,100	1,323	6.0	4.0	20,400	1,755	6.4	4.8	22,200	2,427	7.3	6.6	25,000
Development	150	.9	1.8	17,200	225	1.0	2.0	19,500	405	1.5	3.0	20,500	542	1.6	3.6	24,300
R&D management[3]	704	4.2	2.7	23,200	843	4.0	3.1	24,300	1,234	4.5	4.0	26,300	2,035	6.1	4.7	27,800
Management or administration	1,133	6.7	5.7	20,600	1,548	7.0	6.7	22,400	2,204	8.0	7.4	25,100	3,056	9.2	10.5	25,400
Teaching	7,504	44.3	9.4	17,000	9,480	42.9	10.4	18,200	10,396	37.8	11.5	19,500	11,415	34.2	12.4	21,800
Consulting	333	2.0	8.2	18,300	400	1.8	7.3	20,500	495	1.8	8.1	22,300	606	1.8	6.7	25,100
Sales/professional services	1,647	9.7	20.4	18,200	2,348	10.6	20.1	20,000	3,222	11.7	21.2	21,200	4,378	13.1	20.8	24,500
Other	641	3.8	9.2	(2)	822	3.7	11.0	(2)	1,652	6.0	12.9	(2)	1,786	5.4	11.4	22,600
No report	342	2.0	9.3	17,600	624	2.8	10.3	20,700	705	2.6	12.1	20,300	692	2.1	16.6	23,200

[1] No median computed for groups with fewer than 20 individuals reporting salary.

[2] Data not available.

[3] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salary computed for full-time employed civilians only.

SOURCE: National Science Foundation

Table 79. Doctoral scientists and engineers by field and race: 1979

Field	White	Black	Asian
Total, all fields	293,500	3,700	21,700
Physical scientists	56,900	600	4,500
Mathematical scientists	13,900	200	1,000
Computer specialists	6,000	10	20
Environmental scientists	14,000	60	500
Engineers	42,100	200	7,700
Life scientists	77,000	1,000	5,100
Psychologists	37,200	600	400
Social scientists	46,400	1,100	2,100

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 80. Doctoral scientists and engineers by type of employer, primary work activity and race: 1979

Employer and work activity	White	Black	Asian
Type of employer:			
Total	276,900	3,400	21,000
Business and industry	70,800	400	8,800
Educational institutions	154,600	2,200	9,900
Federal Government	21,800	400	1,000
Other[1]	29,700	400	1,300
Primary work activity:			
Total	276,900	3,400	21,000
Research and development[2]	123,300	1,200	13,300
Teaching	82,100	1,200	4,800
Other[3]	71,500	1,000	2,900

[1] Includes hospitals/clinics, nonprofit organizations, military, State and other government, other and no report.

[2] Includes management of research and development.

[3] Includes management of non-research and development, consulting, sales/professional services, other, and no report.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 81. Median annual salary of full-time employed doctoral scientists and engineers reporting research and development[1] as their primary work activity: 1973, 1975, 1977, and 1979

	1973	1975	1977	1979
Both sexes	$21,700	$24,600	$27,300	$30,900
Men	21,900	24,800	27,800	31,400
Women	17,900	19,800	21,700	24,100

[1] R&D includes management of R&D basic research, applie research, development of systems, and design.

NOTE: Median salaries computed for full-time employe civilians only.

SOURCE: Survey of Doctorate Recipients, CHR, Nationa Research Council

Table 82. Bachelor's and first-professional degrees awarded by field: 1960-80

Year	All fields	Science and engineering fields						All other fields[4]
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	394,889	120,937	16,057	37,808	11,437	24,141	31,494	273,952
1961	401,784	121,660	15,500	35,866	13,127	23,900	33,267	280,124
1962	420,485	127,469	15,894	34,735	14,610	25,200	37,030	293,016
1963	450,592	135,964	16,276	33,458	16,128	27,801	42,308	314,628
1964	502,104	153,361	17,527	[illegible],226	18,677	31,611	50,320	348,743
1965	538,930	164,936	17,916	36,795	19,668	34,842	55,715	373,994
1966	555,613	173,471	17,186	35,815	20,182	36,964	63,424	382,142
1967	594,862	187,849	17,794	36,188	21,530	39,408	72,929	407,013
1968	671,591	212,174	19,442	37,614	24,084	43,260	87,774	459,417
1969	769,683	244,519	21,591	41,553	28,263	48,713	104,399	525,164
1970	833,322	264,122	21,551	44,772	29,109	52,129	116,561	569,200
1971	884,386	271,176	21,549	45,387	27,306	51,461	125,473	613,210
1972	937,884	281,228	20,887	46,003	27,250	51,484	133,604	656,656
1973	980,707	295,391	20,809	46,989	27,528	59,486	140,579	685,316
1974	1,008,654	305,062	21,287	43,530	26,570	68,226	145,449	703,592
1975	987,922	294,920	20,896	40,065	23,385	72,710	137,864	693,002
1976	997,504	292,174	21,559	39,114	21,749	77,301	132,451	705,330
1977	993,008	288,543	22,618	41,581	20,729	78,472	125,143	704,465
1978	997,165	288,167	23,175	47,411	19,925	77,138	120,518	708,998
1979	1,000,562	288,625	23,363	53,720	20,670	75,085	115,787	711,937
1980	1,010,777	291,983	23,661	59,240	22,686	71,617	114,779	718,794
	As a percent of fields							
1960	100	31	4	10	3	6	8	69
1961	100	30	4	9	3	6	8	70
1962	100	30	4	8	4	6	9	70
1963	100	30	4	7	4	6	9	70
1964	100	31	4	7	4	6	10	69
1965	100	31	3	7	4	7	10	69
1966	100	31	3	6	4	7	11	69
1967	100	32	3	6	4	7	12	68
1968	100	32	3	6	4	6	13	68
1969	100	32	3	5	4	6	14	68
1970	100	32	3	5	4	6	14	68
1971	100	31	2	5	3	6	14	69
1972	100	30	2	5	3	6	14	70
1973	100	30	2	5	3	6	14	70
1974	100	30	2	4	3	7	14	70
1975	100	30	2	4	2	7	14	70
1976	100	29	2	4	2	8	13	71
1977	100	29	2	4	2	8	13	71
1978	100	29	2	5	2	8	12	71
1979	100	29	2	5	2	8	12	71
1980	100	29	2	6	2	7	11	71

[1] Including environmental sciences.

[2] Including statistics and computer specialties.

[3] Excluding history and including psychology.

[4] Including first-professional degrees such as M.D., D.D.S., D.V.M., and J.D. degrees.

NOTE: Percents may not add to 100 because of rounding.

SOURCES: National Center for Education Statistics and National Science Foundation, unpublished data

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Table 83. Master's degrees awarded by field: 1960-80

Year	All fields	Science and engineering fields						All other fields
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	74,497	20,012	3,387	7,159	1,765	3,751	3,950	54,485
1961	78,269	22,786	3,799	8,178	2,238	4,085	4,486	55,483
1962	84,889	25,146	3,929	8,909	2,680	4,672	4,956	59,743
1963	91,418	27,367	4,132	9,635	3,323	4,718	5,559	64,051
1964	101,122	30,271	4,567	10,827	3,603	5,357	5,917	70,851
1965	112,195	33,835	4,918	12,056	4,294	5,978	6,589	78,360
1966	140,772	38,083	4,992	13,678	5,610	6,666	7,737	102,689
1967	157,892	41,800	5,412	13,885	5,733	7,465	9,305	116,092
1968	177,150	45,425	5,508	15,188	6,081	8,315	10,333	131,725
1969	194,414	48,425	5,911	15,243	6,735	8,809	11,727	145,989
1970	209,387	49,318	5,948	15,597	7,107	8,590	12,076	160,069
1971	231,486	50,624	6,366	16,347	6,789	8,320	12,782	180,862
1972	252,774	53,567	6,307	16,802	7,186	8,914	14,358	199,207
1973	264,525	54,234	6,274	16,758	7,146	9,080	14,976	210,291
1974	278,259	54,175	6,087	15,393	7,116	9,605	15,974	224,084
1975	293,651	53,852	5,830	15,434	6,637	9,618	16,333	239,799
1976	313,001	54,747	5,485	16,170	6,466	9,823	16,803	258,254
1977	318,241	56,731	5,345	16,889	6,496	10,707	17,294	261,510
1978	312,816	56,237	5,576	17,105	6,421	10,711	16,514	256,579
1979	302,075	54,456	5,464	16,193	6,101	10,719	15,979	247,619
1980	299,095	54,391	5,233	16,846	6,515	10,278	15,519	244,704
	As a percent of all fields							
1960	100	27	5	10	2	5	5	73
1961	100	29	5	10	3	5	6	71
1962	100	30	5	11	3	6	6	70
1963	100	30	5	11	4	5	6	70
1964	100	30	5	11	4	5	6	70
1965	100	30	4	11	4	5	6	70
1966	100	27	4	10	4	5	6	73
1967	100	26	3	9	4	5	6	74
1968	100	26	3	9	3	5	6	74
1969	100	25	3	8	4	5	6	75
1970	100	24	3	7	3	4	6	76
1971	100	22	3	7	3	4	6	78
1972	100	21	3	7	3	4	6	79
1973	100	21	2	6	3	3	6	79
1974	100	19	2	6	3	3	6	81
1975	100	18	2	5	2	3	6	82
1976	100	17	2	5	2	3	5	83
1977	100	18	2	5	2	3	5	82
1978	100	18	2	5	2	3	5	82
1979	100	18	2	5	2	4	5	82
1980	100	18	2	6	2	3	5	82

[1] Including environmental sciences.

[2] Including statistics and computer specialties.

[3] Excluding history and including psychology.

NOTE: Percents may not add to 100 because of rounding.

SOURCES: National Center for Education Statistics and National Science Foundation, unpublished data

Table 84. Doctoral degrees awarded by field: 1965-80

Year	All fields	Science and engineering fields						All other fields[4]
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1965	16,340	10,477	2,865	2,073	685	2,539	2,315	5,863
1966	17,953	11,456	3,058	2,299	769	2,712	2,618	6,497
1967	20,384	12,982	3,502	2,603	830	2,967	3,080	7,402
1968	22,916	14,411	3,667	2,847	970	3,501	3,426	8,505
1969	25,724	15,949	3,910	3,249	1,064	3,796	3,930	9,775
1970	29,475	17,731	4,400	3,432	1,222	4,163	4,514	11,744
1971	31,772	18,880	4,494	3,495	1,236	4,533	5,122	12,892
1972	33,001	18,940	4,226	3,475	1,281	4,505	5,453	14,061
1973	33,727	18,948	4,016	3,338	1,222	4,574	5,798	14,779
1974	33,000	18,316	3,696	3,144	1,196	4,407	5,873	14,684
1975	32,913	18,352	3,611	2,959	1,149	4,540	6,093	14,561
1976	32,923	17,832	3,442	2,791	1,003	4,480	6,116	15,091
1977	31,672	17,373	3,410	2,641	959	4,266	6,097	14,299
1978	30,850	17,034	3,234	2,423	959	4,361	6,057	13,816
1979	31,200	17,230	3,321	2,494	979	4,495	5,943	13,944
1980	30,982	17,195	3,151	2,479	963	4,710	5,892	13,787
	As a percent of all fields							
1965	100	64	18	13	4	16	14	36
1966	100	64	17	13	4	15	15	36
1967	100	64	17	13	4	15	15	36
1968	100	63	16	12	4	15	15	37
1969	100	62	15	13	4	15	15	38
1970	100	60	15	12	4	14	15	40
1971	100	59	14	11	4	14	16	41
1972	100	57	13	11	4	14	17	43
1973	100	56	12	10	4	14	17	44
1974	100	56	11	10	4	13	18	45
1975	100	56	11	9	3	14	19	44
1976	100	54	10	8	3	14	19	46
1977	100	55	11	8	3	13	19	45
1978	100	55	10	8	3	14	20	45
1979	100	55	11	8	3	14	19	45
1980	100	55	10	8	3	15	19	45

[1] Including environmental sciences.
[2] Including statistics and computer specialties.
[3] Including psychology.
[4] Including first-professional degrees such as M.D., D.D.S., D.V.M., and J.D. degrees.
SOURCES: National Academy of Sciences

Table 85. Employed 1978 science/engineering graduates by field, level of degree, and field of employment in 1980

Field of degree	Field of employment[1] Total employed	Chemistry	Physics/ astronomy	Other physical sciences	Mathematical sciences	Computer specialties	Environ. sciences	Engineering	Life sciences	Psychology	Social sciences	Non-science/ engineering
	Bachelor's degrees											
Total	215,800	5,000	700	700	1,800	16,200	3,500	51,000	21,500	5,200	5,400	104,100
Chemistry	5,800	2,700	—	100	—	400	30	500	800	—	100	1,200
Physics/astronomy	1,800	—	400	70	100	300	—	700	—	—	—	400
Other physical sciences	1,000	—	—	300	—	—	—	100	—	—	—	600
Mathematical sciences	10,100	—	—	—	1,100	4,100	100	700	100	—	—	3,800
Computer specialties	6,800	—	—	—	—	6,000	—	200	100	—	60	500
Environmental sciences	7,200	100	—	100	—	500	2,500	800	300	—	50	2.800
Engineering	51,600	30	—	—	100	1,400	200	45,300	400	—	—	4,200
Life sciences	46,400	2,100	300	100	—	1,200	400	1,500	17,300	300	500	21,900
Psychology	32,900	—	—	—	100	800	—	200	—	4,900	600	26,400
Social sciences	52,100	100	—	—	400	1,600	200	1,000	1,900	100	4,100	42,400
	Master's degrees											
Total	43,200	1,100	600	100	1,400	4,500	1,700	14,400	5,400	3,600	2,500	7,600
Chemistry	1,300	1,000	—	—	—	—	100	100	—	—	—	100
Physics/astronomy	800	—	300	30	30	200	—	200	—	—	—	30
Other physical sciences	200	—	50	—	—	—	50	—	—	—	—	100
Mathematical sciences	2,600	—	—	—	1,100	700	—	200	—	—	—	600
Computer specialties	2,700	—	—	—	—	2,300	—	300	—	40	—	100
Environmental sciences	1,900	30	—	50	—	30	1,300	100	100	—	10	300
Engineering	15,200	40	100	—	100	1,000	100	13,200	—	—	50	600
Life sciences	7,600	60	—	60	20	40	80	200	5,200	—	100	1,800
Psychology	5,500	—	—	—	50	100	—	—	100	3,500	—	1,700
Social sciences	5,400	—	200	—	100	200	—	100	—	100	2,400	2,200

[1] Does not include full-time graduate students.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, unpublished data

related publications — cont.

	NSF No.	Price
S/E Personnel		
U.S. Scientists and Engineers, 1980	82-314	In press
Characteristics of Recent Science/ Engineering Graduates, 1980	82-313	-----
Academic Science: Scientists and Engineers, January 1981	82-305	-----
Academic Science: Graduate Enrollment and Support, Fall 1980	81-330	-----
Scientists, Engineers, and Technicians in Private Industry, 1980	81-329	-----
Federal Scientific and Technical Personnel, 1976, 1977, and 1978	81-309	-----
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	NSF No.	Price
R&D Funds		
Federal Funds for Research and Development, Fiscal Years 1980, 1981, and 1982, Volume XXX	82-321	In press
1990 R&D Funding Projections	82-315	In press
Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1980	82-308	$6.50
Research and Development in Industry, 1979. Funds, 1979; Scientists and Engineers, January 1980	82-304	-----
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Science and Engineering Employment: 1970-80	81-310	$2.75
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Occupational Mobility of Scientists and Engineers	80-317	$1.75
Employment Patterns of Academic Scientists and Engineers, 1973-78	80-314	$1.75
Composite		
Science and Engineering Personnel: A National Overview	82-318	In press
National Patterns of Science and Technology Resources, 1981	81-311	$4.75
Academic Science, 1972-81: R&D Funds, Scientists and Engineers, Graduate Enrollment and Support	81-326	-----